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ABSTRACT

Early Childhood Research and Practice (ECRP), a peer reviewed, Internet-only journal sponsored by the ERIC Clearinghouse on Elementary and Early Childhood Education (ERIC/EECE), covers topics related to the development, care, and education of children from birth to approximately age 8. The journal emphasizes articles reporting on practice-related research and on issues related to practice, parent participation, and policy. Also included are articles and essays that present opinions and reflections. The first part of this issue of ECRP contains the following major articles on research and practice: (1) "Moving up the Grades: Relationship between Preschool Model and Later School Success" (Rebecca A. Marcon); (2) "The Role of Pretend Play in Children's Cognitive Development" (Doris Bergen); (3) "Learning To Guide Preschool Children's Mathematical Understanding: A Teacher's Professional Growth" (Anna Kirova and Ambika Bhargava); and (4) "Demographic Characteristics of Early Childhood Teachers and Structural Elements of Early Care and Education in the United States" (Gitanjali Saluja, Diane M. Early, and Richard M. Clifford). The second part presents the following observations and reflections: (1) "Three Approaches from Europe: Waldorf, Montessori, and Reggio Emilia" (Carolyn Pope Edwards). Two additional feature articles focus on child care and the Project Approach: (1) "Keeping Current in Child Care Research--Annotated Bibliography: An Update" (Deborah Ceglowski and Cara Bacigalupa); and (2) "Faces to the Window: The Construction Project" (Julia H. Berry & Elizabeth H. Allen). The journal concludes with a description of new ERIC/EECE publications and activities, along with general information and links related to the journal. (HTH)

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ECRP
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an Internet journal on the development, care, and education of young children

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Moving up the Grades: Relationship between Preschool Model and Later School Success

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Abstract

A follow-up study of children who began school at age 4 (referred to as Year 1 in this study) was conducted to examine the influence of three different preschool models on later school success. These children from an urban school district were studied again in Year 5 as they prepared to leave the primary grades and in Year 6 when they were scheduled to enter fourth grade if not previously retained. The study examined report card grades, retention rates, and special education placement of 160 children at the end of their fifth year in school and 183 children at the end of their sixth year in school. The sample was 96% African American and 54% female, with 75% of the children qualifying for subsidized school lunch and 73% living in single-parent families. Academically, girls surpassed boys at the end of Year 5, and this difference persisted into the next grade level. Children whose preschool experience was more academically directed had been retained less often than peers. No differences attributable to preschool model were found for special education placement. By the end of children's fifth year in school, there were no significant differences in academic performance of children who had experienced three different preschool models. By the end of their sixth year in school, children whose preschool experiences had been academically directed earned significantly lower grades compared to children who had attended child-initiated preschool classes. Children's later school success appears to have been enhanced by more active, child-initiated early learning experiences. Their progress may have been slowed by overly academic preschool experiences that introduced formalized learning experiences too early for most children's developmental status.

Introduction

In the ongoing debate over education reform designed to improve academic performance of American children, preschools are under increasing pressure to offer instruction in basic academic skills. This trend is especially prevalent in programs that serve low-income children. Compensatory early childhood programs such as Head Start and state-sponsored pre-kindergarten for low-income families and preschoolers with special needs are designed to help children acquire skills needed for later school success. Although the goal of school readiness is widely shared among early childhood educators, parents, and policy makers, the strategies for achieving this goal vary greatly. Fundamental philosophical and political differences in beliefs about the purpose of schooling, value orientations, and cultural priorities

are central to the debate on how to best prepare young children for formal schooling (Kessler, 1991).

Kindergarten retention rates have increased (e.g., Shepard & Smith, 1988), perhaps due to the downward shift in curriculum that introduces formal reading and mathematics instruction much earlier. Escalating academic demands in kindergarten have clearly affected preschool programs for even younger children. Goffin (1994) noted a downward movement of the debate between developmental and academic orientations from elementary education to the preschool setting. When preschool was "reconceptualized as an appropriate beginning for primary schooling (especially for low-income children)," public school programs for 4-year-olds grew in number (Goffin, 1994, p. 120).

Beginning in the 1980s, leading early childhood experts expressed concern about the wisdom of overly didactic, formal instructional practices for young children (e.g., Elkind, 1986; Zigler, 1987). They feared that short-term academic gains would be offset by long-term stifling of children's motivation and self-initiated learning. Later research suggests that these early concerns were warranted. Compared to children whose kindergarten experience emphasized child-initiated learning, primary-grade teachers rated children from didactic, teacher-centered kindergartens lower in conduct and work-study habits, and perceived them to be more distractible, less willing to follow directions, and less prosocial (Hart, Charlesworth, Burts, & DeWolf, 1993). Stipek, Feiler, Daniels, and Milburn (1995) also found motivational differences favoring a child-initiated view of early education compared to a more formalized, didactic approach. They cautioned that early academic gains in reading skills associated with didactic instruction of preschoolers "come with some costs" that could have long-term negative effects on achievement. DeVries, Reese-Learned, and Morgan (1991) expressed similar concerns, arguing that temporary benefits of highly didactic approaches with young children cannot be justified in light of possible negative consequences for social development. Today, as Walsh (1989) predicted, the likelihood that children will experience a highly didactic, teacher-centered approach has increased as preschool is absorbed into public schools where a narrowly focused, externally imposed curriculum makes the preschool experience even more like elementary school.

Although it was once believed that any well-implemented preschool program would achieve positive results (e.g., Lazar, Darlington, Murray, Royce, & Snipper, 1982), a growing research base suggests otherwise (see Marcon, 1999, for a review of research on different preschool approaches). Of particular interest in the present study was sustainability of an earlier preschool approach's influence on academic performance. Several researchers have found that later school success declined when the intervention was discontinued. For example, Miller and Dyer (1975) found a drop in school achievement for children who entered a nondidactic program following a direct instruction preschool experience. Similarly, when the highly didactic Direct Instructional System for the Teaching of Arithmetic and Reading (DISTAR) was discontinued after third grade, children's previously high achievement in reading and mathematics declined (Becker & Gersten, 1982). Early academic success fostered by a child-initiated approach has been documented by a number of different researchers (e.g., Burts, Hart, Charlesworth, & DeWolf, 1993; Marcon, 1993, 1999; Weikart, Epstein, Schweinhart, & Bond, 1978). Some long-term benefits of this approach have been found for school achievement (e.g., Miller & Bizzell, 1984) as well as for social behavior and general school competence (e.g., Schweinhart & Weikart, 1997; Schweinhart, Weikart, & Larner, 1986). Little is known, however, about the long-term effect of early intervention that combines didactic, teacher-centered strategies with child-initiated learning experiences. In the short term, this combination approach has varying

outcomes, with some research favoring the strategy, especially for lower functioning children (e.g., Mills, Dale, Cole, & Jenkins, 1995). A preponderance of the research evidence, however, has failed to support the combination approach (e.g., DeVries et al., 1991; Marcon, 1999; Pfannenstiel & Schattgen, 1997; Rawl & O'Tuel, 1982). Knowing how later school success of these children compares with that of children exposed to other preschool models would be useful in determining the effectiveness of a combination strategy.

A second area of interest in the present study involved sex differences in later school success. Academically, studies of low-income children have found that girls did better than boys in pre-kindergarten (e.g., Marcon, 1999), kindergarten (e.g., Burts et al., 1993; Marcon, 1993), and in first grade (e.g., Reynolds, 1989). Boys do notably better in both the short and long term when their early learning experiences have been more child initiated rather than more didactic in nature (e.g., Marcon, 1993; Miller & Bizzell, 1984). Successful transition between grade levels may also be moderated by sex. Parents and principals believe boys have more difficulty than girls in making the transition from third to fourth grade (Mayfield, 1983). Furthermore, differences in school competence (especially rates of nonpromotion) among African American children may be intensified by negative attitudes and behaviors toward school exhibited as early as fourth grade by African American boys (Rowan, 1989). Further examination of sex differences in later school success of low-income children and possible interaction with preschool model would add to our understanding of the often difficult transition from the primary to the later elementary school grades.

The present study provides follow-up data for one cohort of low-income, minority children who had attended two years of school (preschool and kindergarten) prior to entering first grade. These children had experienced one of three different types of preschool: child-initiated, academically directed, or a "combination" approach. In this earlier quasi-experimental study, Marcon (1999) compared the three different approaches for their effect on children's development and mastery of basic skills at the end of preschool. Findings indicated that children whose preschool experiences had been child-initiated demonstrated greater mastery of basic skills at the end of preschool than did children in programs where academics were emphasized and skills were directly taught. At the end of preschool, children in the "combination" model did significantly poorer on all measures except self-help and development of social coping skills compared to children in either the child-initiated or academically directed models. Preschool girls outperformed boys in all areas except gross motor development and play/leisure skills. This follow-up study examines the transition from children's fifth to sixth year in school (third to fourth grade for most of these children). Based on earlier findings for these children and results of other research studies (e.g., Miller & Bizzell, 1984; Schweinhart & Weikart, 1997; Schweinhart, Weikart, & Larner, 1986), it was thought that any difference in later school success attributable to preschool model would favor the child-initiated early learning approach. Children who had experienced "combination" preschool curricula were expected to be least successful, whereas later school performance of those who had attended didactic, teacher-centered preschools was expected to be intermediary. Sex differences in school achievement favoring girls were expected to persist because boys, in general, do not perform as well in the early years of school (Richardson, Koller, & Katz, 1986), and African American boys, unlike boys in general, do not typically show a rise in school achievement following the elementary school years (Pollard, 1993). The type of preschool experience was expected to have a greater effect on later school achievement of boys than on girls.

Method

Participants

Children who began school at age 4 (referred to as Year 1 in this study) were studied again in Year 5 (when they were expected to be in third grade if not previously retained) and Year 6 (when they were expected to be in fourth grade if not previously retained) of their educational experience. This sample of urban students included 160 Year 5 children (M age = 107.6 months, SD = 3.9) in 61 schools and 183 Year 6 children (M age = 119.8 months, SD = 3.6) in 70 schools. The initial sample had been randomly selected proportional to enrollment of 4-year-olds in subdistricts within the school system. Each subdistrict was represented by at least one classroom for each of the three models studied. This stratified sample was geographically dispersed across the city and was representative of socioeconomic, administrative, and local variations within the school system (see Marcon, 1992, for a description of random selection and stratification procedures used in the original cohort study).

This follow-up sample from the original cohort was 96% African American and 54% female. Most children (75%) qualified for subsidized school lunch based on low family income, and 73% of the children lived in single-parent families. Data from both Years 5 and 6 were available for a subsample of the children (n = 139) in 64 schools. Subsample children did not differ significantly from the larger follow-up sample in any demographic characteristics.

Recovery rate from preschool to fourth grade was 64% of the original sample. Although this attrition rate was high, it was not unexpected, and attrition was comparable across the preschool models, $\chi^2(2) = 1.80$, $p = .41$. The recovered follow-up sample was not significantly different from the original preschool sample in terms of gender ($p = .92$), age ($p = .82$), parent involvement ($p = .34$), overall adaptive behavior ($p = .16$), social and work habits ($p = .23$), or physical development ($p = .15$) in preschool. Preschool grades of children in the recovered follow-up sample were, however, 3% lower than the original sample ($p = .02$). Compared to the original preschool sample, the recovered follow-up sample had more African American and fewer White children, $\chi^2(3) = 15.34$, $p = .01$, who were poorer, $\chi^2(1) = 12.60$, $p < .001$, and more likely to live in single-parent families, $\chi^2(1) = 4.83$, $p = .03$. These differences were consistent with school districtwide changes in enrollment patterns following pre-kindergarten and kindergarten when children of many middle-class families leave the public school system.

At age 4, all children had attended free, full-school-day preschool in the same urban school district, with approximately 84% of the sample having been enrolled in pre-kindergarten and 16% in Head Start. Eligibility for pre-kindergarten was based solely on age and residency, whereas Head Start eligibility had an additional federal requirement of low family income. All preschool teachers of children in this study, both pre-kindergarten and Head Start, held a bachelor's degree or higher. Their median pre-kindergarten or Head Start teaching experience was approximately 10 years. As previously classified (see "Measures and Procedures" section for details), approximately 33% of children in this follow-up sample had attended preschool classes that followed a child-initiated approach, 35% attended academically directed preschool classes, and the remaining 32% had been enrolled in middle-of-the-road preschool classes that combined the other two preschool approaches. No Head Start classes in this school district used an academically directed approach. Kindergarten in this school district was predominantly academic in focus, with all but a handful of teachers indicating a strong belief that academic preparation was a more important goal of kindergarten than children's socioemotional growth (Marcon, 1990, 1993). All first-grade teachers in this school district emphasized academics, with approximately two-thirds using a highly didactic, academically directed approach (Marcon,

1990).

Measures and Procedures

Preschool Model. The Pre-K Survey of Beliefs and Practices (see Marcon, 1999, for instrument and details) was used to classify children's early learning experiences based on five theoretical differences between early childhood models: (1) scope of developmental goals, (2) conception of how children learn, (3) amount of autonomy given to the child, (4) conception of teacher's role, and (5) provision of possibilities for learning from peers. Three groupings identified through cluster analysis using Ward's method were selected as examples of the divergent preschool models operating in this urban school system. One group was composed of child development-oriented teachers who facilitated learning by allowing children to actively direct the focus of their learning. These *child-initiated* preschool classrooms were referred to as Model CI. Another group represented more academically oriented teachers who preferred more direct instruction and teacher-directed learning experiences for preschoolers. These *academically directed* preschool classrooms were referred to as Model AD. The third group represented teachers whose beliefs and practices fell in between the other two opposing models by endorsing a combination approach. These *middle-of-the-road* preschool classrooms were referred to as Model M.

In the original study, accuracy of model classification based upon survey response was affirmed by independent classroom observers, and findings were congruous with other research demonstrating strong consistency between outside raters' observations of early childhood instructional activities and teachers' self-reported beliefs and practices (e.g., Charlesworth, Hart, Burts, Mosley, & Fleege, 1993; Hyson, Hirsch-Pasek, & Rescorla,1990; Kagan & Smith, 1988; Vartuli, 1999). In the original study, Model CI and Model AD classifications were easily verified by independent classroom observers, but these same observers had some difficulty categorizing Model M practices in several classrooms. Model M teachers appeared to be closer to Model CI in goals but more like Model AD in teacher initiation of activities. Compared to Model CI teachers, the Model M teacher was notably more engaged in leading groups of children in less-individualized activities for longer periods of time. Compared to Model AD teachers, the Model M teacher allowed children greater access to classroom materials, encouraged more peer interaction, and initiated fewer teacher-directed cognitive activities that were not well integrated with other developmental domains. These Model M teachers were not, however, using a Vygotskian approach to foster children's early learning and development. Model M teachers were best described as professionals who sought to blend notions of child development with their school system's competency-based curriculum. Their basis for doing so was most likely pragmatic.

Report Cards. Data were collected from teachers and school records at the end of Year 5 and Year 6. The school district's Elementary School Progress Report (report card) was used to compare children's classroom performance with the district's expectations for skills mastery. Like many urban school districts, a competency-based curriculum (CBC) was in place throughout most of the school system, and children were expected to demonstrate mastery of specific reading and arithmetic skills before advancing to the next grade level. CBC defined a skill as being mastered when a child could perform it upon request and provided teachers with three mastery assessment tasks for each reading and arithmetic objective (see McClure & Leigh, 1981, for details of this school system's CBC). For research purposes, Progress Report grades were converted to the standard 5-point numeric scale: 0 = F, 1 = D, 2 = C, 3 = B, and 4 = A.

Each child's overall grade point average (GPA) was calculated. Grades in each of 11 subject areas were also converted to numeric scores: arithmetic, reading, language, spelling, handwriting, social studies, science, art, music, health/physical education (PE), and citizenship. Citizenship grades provided a global assessment of a child's deportment while attending school. School records and teacher report provided information on the child's eligibility for subsidized school lunch and the number of parents or guardians living at home with the child (scored as 1 or 2).

Results

School Competence: Special Education Placement and Retention

Year 5. During the primary grades (first, second, and third grades), this school district was more inclined to use retention in grade rather than special education services for children who experienced academic difficulties. By Year 5, less than 1% of this random sample had received special education services, whereas 20% had been retained in grade. No significant differences in special education placement were found for preschool model or sex. Special education placement during the primary grades was not related to family income as measured by eligibility for subsidized school lunch ($p = .44$) or to the child's living in a single-parent family ($p = .43$).

Boys were more likely to have been retained prior to Year 5 (34%) than were girls (10%), $\chi^2(1, N = 161) = 13.97$, $p < .001$. Similarly, teachers were likely to recommend more boys (23%) than girls (11%) for retention at the end of Year 5, $\chi^2(1, N = 165) = 4.28$, $p = .04$. Although no significant difference in retention rate attributable to preschool model was found for girls ($p = .41$), Model AD boys had a significantly lower rate of retention prior to third grade than did boys who had attended other types of preschool, $\chi^2(2, n = 71) = 7.20$, $p = .03$. Overall, fewer children who had attended Model AD preschools had been retained prior to third grade (10%), $\chi^2(2, N = 161) = 5.50$, $p = .06$, compared to retention rates of 24% and 26% for Models CI and M, respectively. There were no significant differences attributable to preschool model in teachers' recommendations for retention at the end of Year 5 ($p = .75$).

Other demographic factors (family income, single-parent families) that could contribute to retention in grade were examined. Lower-income children were more likely than higher-income children to have been retained prior to third grade, $\chi^2(1, N = 160) = 7.02$, $p = .01$. Although no significant difference in retention rate at the end of Year 5 was found between children who did or did not qualify for subsidized lunch ($p = .14$), teachers recommended far fewer children who did not qualify for subsidized lunch for retention than was expected statistically. Children who lived in single-parent versus two-parent families did not differ in retention rates prior to Year 5 ($p = .18$). At the end of Year 5, however, teachers were somewhat less likely to recommend retention for children who were growing up in two-parent families, $\chi^2(1, N = 133) = 2.44$, $p = .12$.

Year 6. Because children were of the age to be leaving the primary grades, this school district was now more inclined to recommend special education services for children who experienced academic difficulties, $\chi^2(1, N = 139) = 5.16$, $p = .02$. In Year 6, the number of children who received special education services increased to 8% of the sample. No significant differences in special education placement were found for preschool model or sex. Special education placement following the primary grades was somewhat related to family income, $\chi^2(1, N = 166) = 2.52$, $p = .11$. Only half as many children who did not qualify for subsidized lunch as expected

statistically were receiving special education services. Special education placement in Year 6 was not related to growing up in a single-parent family ($p = .31$). Possibly due to increases in special education placement, teachers' recommendations for retention at the end of Year 6 (10%) decreased in comparison with retention recommendations made at the end of Year 5 (16%). No significant differences were found in recommended retention at the end of Year 6 for preschool model, sex, or family income. Teachers were more likely to recommend children from single-parent families for retention at the end of Year 6 than children living in two-parent families, $\chi^2(1, N = 149) = 4.25, p = .04$.

Year 5 Report Cards

A 3 x 2 (Preschool Model x Sex) analysis of covariance (ANCOVA) was used to test for differential effects of preschool model on children's grades, sex differences, and possible Preschool Model x Sex interactions at the end of Year 5 in school. The covariate used to control for possible economic differences between children was eligibility for subsidized school lunch (based on family income and size). Although a direct measure of family income would have been a more desirable covariate, it was not available. Eligibility for subsidized school lunch should be highly correlated with family income and is a widely used estimate of family income in public school evaluation research. All reported means have been adjusted for the covariate. Missing scores were not imputed. The academic performance of children who were "on schedule" at the end of Year 5 (third grade), as well as performance of children who had been retained prior to third grade, was examined in this follow-up study.

Preschool Model. No significant main effect for preschool model was found in Year 5 overall GPA or any specific subject area for either "on schedule" or "retained" children. A statistical trend toward significant differences between preschool models was found for Year 5 citizenship grades, $F(2, 153) = 2.66, p = .07$. Overall, Model AD children received citizenship grades that were 6% and 19% lower than Model CI and Model M children, respectively. Citizenship grades reflect children's deportment in school. At the end of Year 5, children from the three different preschool models were performing academically at a comparable level. Teachers did, however, see the school behavior of children who had attended academically directed preschools as being notably poorer than that of peers.

Sex Differences. A significant sex difference was found in overall Year 5 GPA, $F(1, 153) = 4.05, p = .05$, with girls earning a 10% higher GPA than boys. Effect size for this difference was moderate (.34). As seen in Figure 1, girls earned higher grades in each of the 11 subject areas. A significant difference was found for citizenship grades, $F(1, 153) = 12.26, p = .001$, with teachers rating girls' school behavior 24% "better" than that of boys. Effect size for the difference in citizenship grades was large (.58). At the end of Year 5, girls were outperforming boys in school.

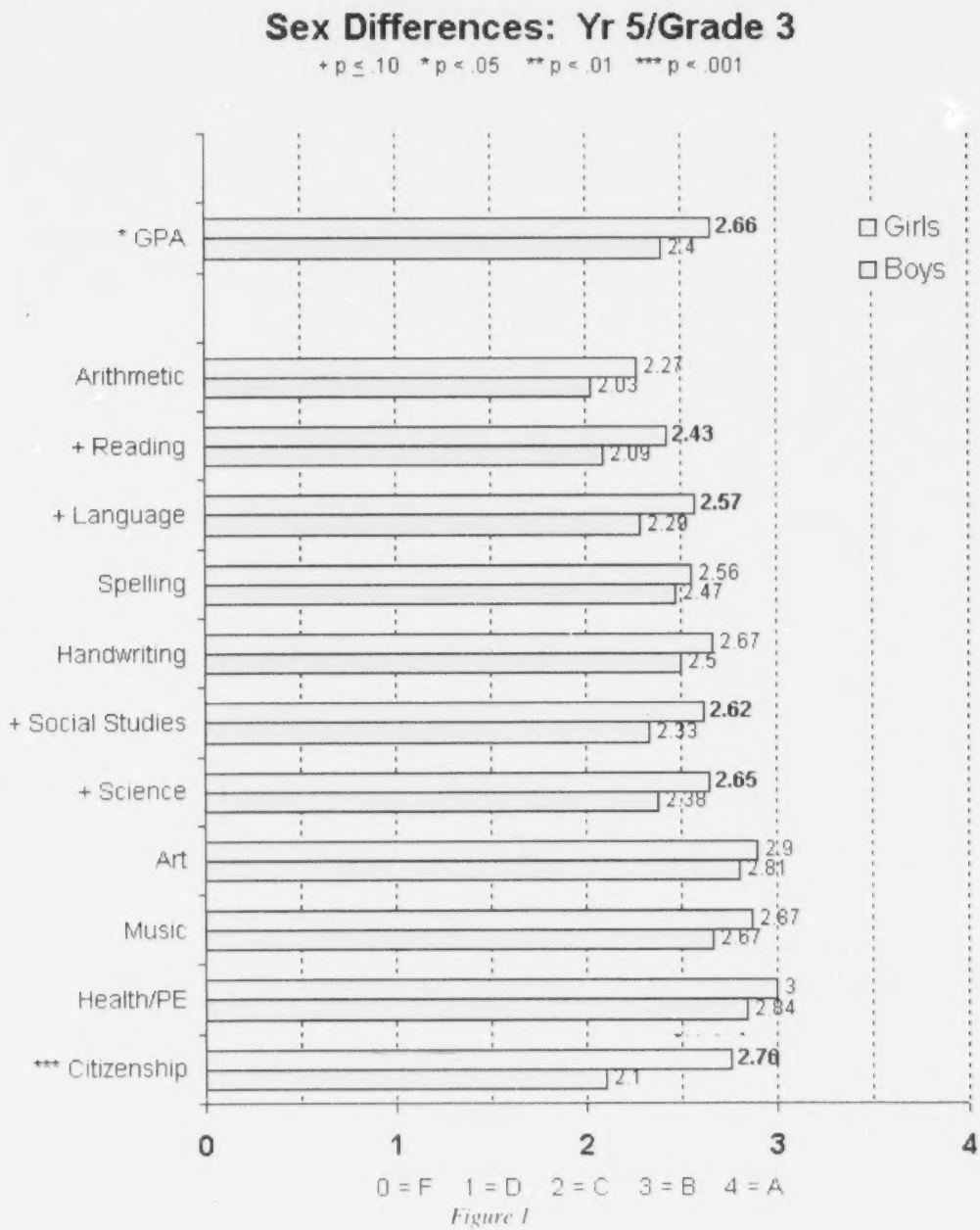

Figure 1

Interactions. No significant Preschool Model x Sex interactions were found for overall GPA or any of the 11 subject areas for either "on schedule" or "retained" children. No statistical trends toward significant group differences were found. The smallest gap between performance of boys and girls appeared for Model M children (boys' GPA was only 2% lower than girls' GPA). In four subject areas (language, spelling, art, and music), Model M boys received somewhat higher grades than did Model M girls. A similar pattern was not present in the other two preschool models.

Year 5 Summary. For children who had attended preschool and kindergarten prior to entering first grade, there was no significant difference in academic performance attributable to preschool

model at the end of children's fifth year in school. Girls outperformed boys in school, but this difference was less noticeable among children who had attended "combination" preschool classes. Teachers rated boys' school behavior lower than girls' behavior. Compared to peers, children who had attended academically directed preschool classes also were rated lower in behavior compared to peers at the end of their fifth year in school.

Year 6 Report Cards

Preschool Models. As shown in Table 1 and Figure 2, a trend towards statistical significance between preschool models was found in Year 6 overall GPA ($p = .07$). GPA for Model CI was 4% higher than Model M and 14% higher than Model AD. The difference between Models CI and AD was moderate (effect size = .38). In all subject areas except music, Model AD children displayed the lowest grades of the three preschool models. In all but three subject areas (language, social studies, and music), Model CI had the highest grades compared to peers who had other types of preschool experiences. Science grades of Model M children equaled those of Model CI. Post hoc Tukey's HSD ($p < .01$) indicated that Models CI and M earned significantly higher health/PE grades than did Model AD. By the end of Year 6, academic performance of children who had attended academically directed preschool classes was beginning to decline. Although not statistically significant, their school behavior continued to be rated somewhat lower than that of peers; Model AD citizenship grades were 14% and 9% lower than Models CI and M, respectively.

Table 1
Year 6 Report Cards: Preschool Model (PM) and Sex Differences (G/B)*

		Preschool Model					
		CI	M	AD	Girls	Boys	ANCOVA
GPA	*M*	2.56	2.46	2.25	2.59	2.25	PM: F (2, 176) = 2.68, p = .07
	SD	.82	.82	.74	.78	.78	G/B: F (2 ,176) = 9.11, p = .003
Arithmetic	*M*	2.26	2.18	1.87	2.24	1.96	PM: F (2, 173) = 2.18, p = .116
	SD	1.10	1.20	1.00	1.04	1.16	G/B: F (2, 173) = 3.00, p = .085
Reading	*M*	2.33	2.11	2.02	2.35	1.96	PM: F (2, 172) = 1.30, p = .27
	SD	1.11	1.21	1.08	1.11	1.14	G/B: F (2, 172) = 5.40, p = .02
Language	*M*	2.28	2.29	2.10	2.36	2.08	PM: F (2, 174) = .62, p = .54
	SD	1.13	1.16	.94	1.12	1.02	G/B: F (2, 174) = 3.06, p = .08
Spelling	*M*	2.56	2.38	2.20	2.67	2.09	PM: F (2, 174) = 1.22, p = .30
	SD	1.27	1.35	1.29	1.27	1.27	G/B: F (2, 174) = 9.22, p = .003

Handwriting	*M*	2.59	2.39	2.37	2.56	2.34	PM: F (2, 175) = .92, p = .40
	SD	.98	.98	1.00	.96	1.01	G/B: F (2, 175) = 2.13, p = .15
Social Studies	*M*	2.37	2.48	2.07	2.49	2.12	PM: F (2, 172) = 2.17, p = .117
	SD	1.10	1.12	1.05	1.12	1.03	G/B: F (2, 172) = 5.55, p = .02
Science	*M*	2.57	2.57	2.27	2.60	2.34	PM: F (2, 170) = 1.83, p = .16
	SD	1.07	1.01	.87	.98	.98	G/B: F (2, 170) = 3.30, p = .07
Art	*M*	2.89	2.73	2.70	2.76	2.79	PM: F (2, 158) = 1.05, p = .35
	SD	.75	.75	.78	.75	.78	G/B: F (2, 158) = .06, p = .81
Music	*M*	2.72	2.78	2.74	2.85	2.64	PM: F (2, 153) = .09, p = .91
	SD	.91	.81	.81	.88	.78	G/B: F (2, 153) = 2.38, p = .125
Health/PE	*M*	3.05	2.90	2.42	2.92	2.66	PM: F (2, 158) = 7.59, p = .001
	SD	.97	.73	.96	.82	1.01	G/B: F (2, 158) = 3.65, p = .058
Citizenship	*M*	2.57	2.44	2.22	2.82	2.00	PM: F (2, 152) = 1.22, p = .30
	SD	1.19	1.35	1.25	1.08	1.28	G/B: F (2, 152) = 20.13, p < .001

*Note: Means adjusted for family income (eligibility for subsidized lunch) covariate.

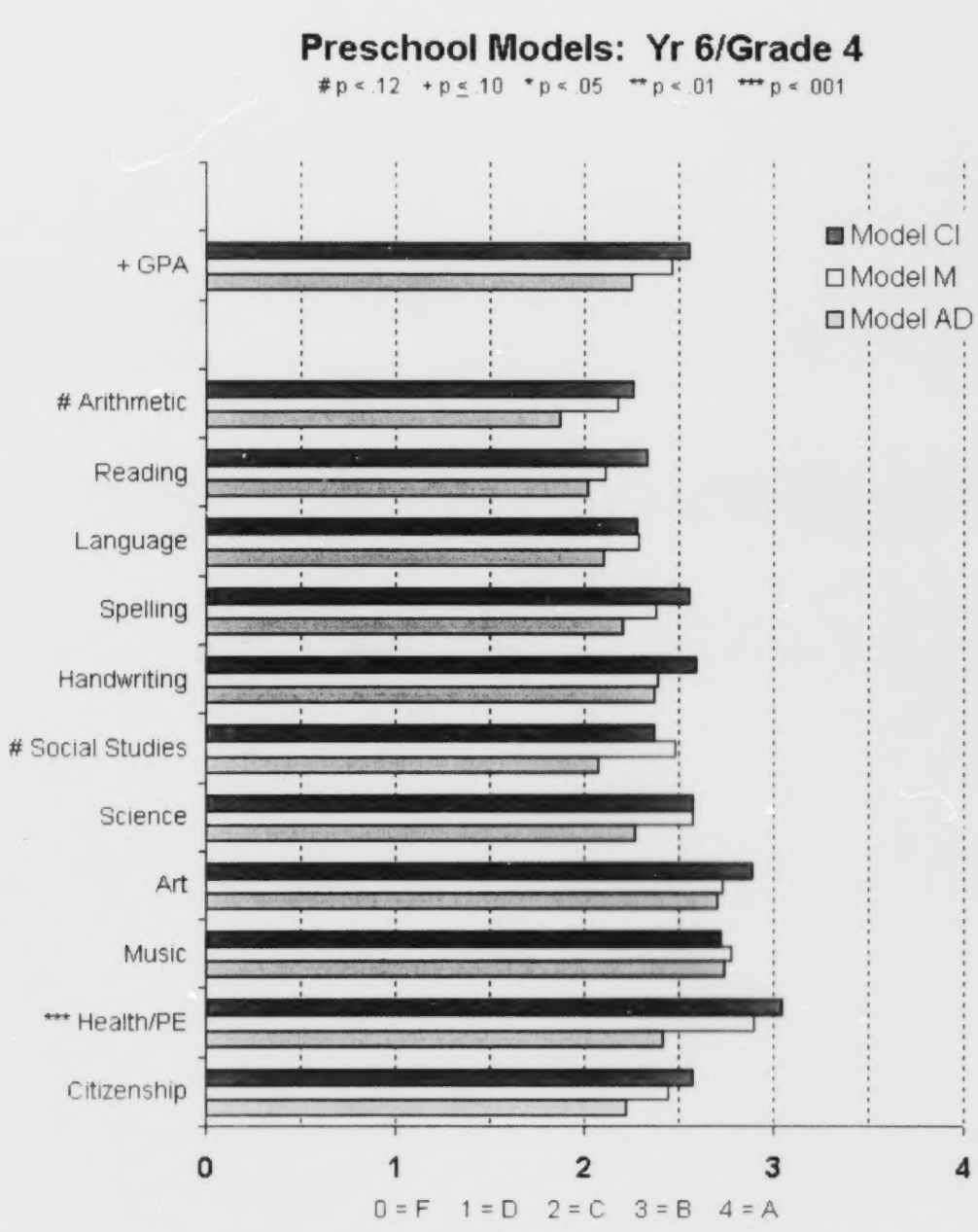

Figure 2

Sex Differences. As shown in Table 1 and Figure 3, a significant sex difference was found in overall GPA (p = .003), with girls receiving 13% higher grades than boys. Effect size for this difference was moderate (.44). Girls earned higher grades in all of the 11 subject areas except art. These differences were statistically significant for reading, spelling, social studies, and citizenship. Effect sizes for sex differences were moderate to large, with the greatest effect size seen in citizenship grades (.76). A trend toward statistically significant differences between girls and boys was found in four other subject areas: arithmetic, language, science, and health/PE. At the end of Year 6, girls continued to outperform boys in school.

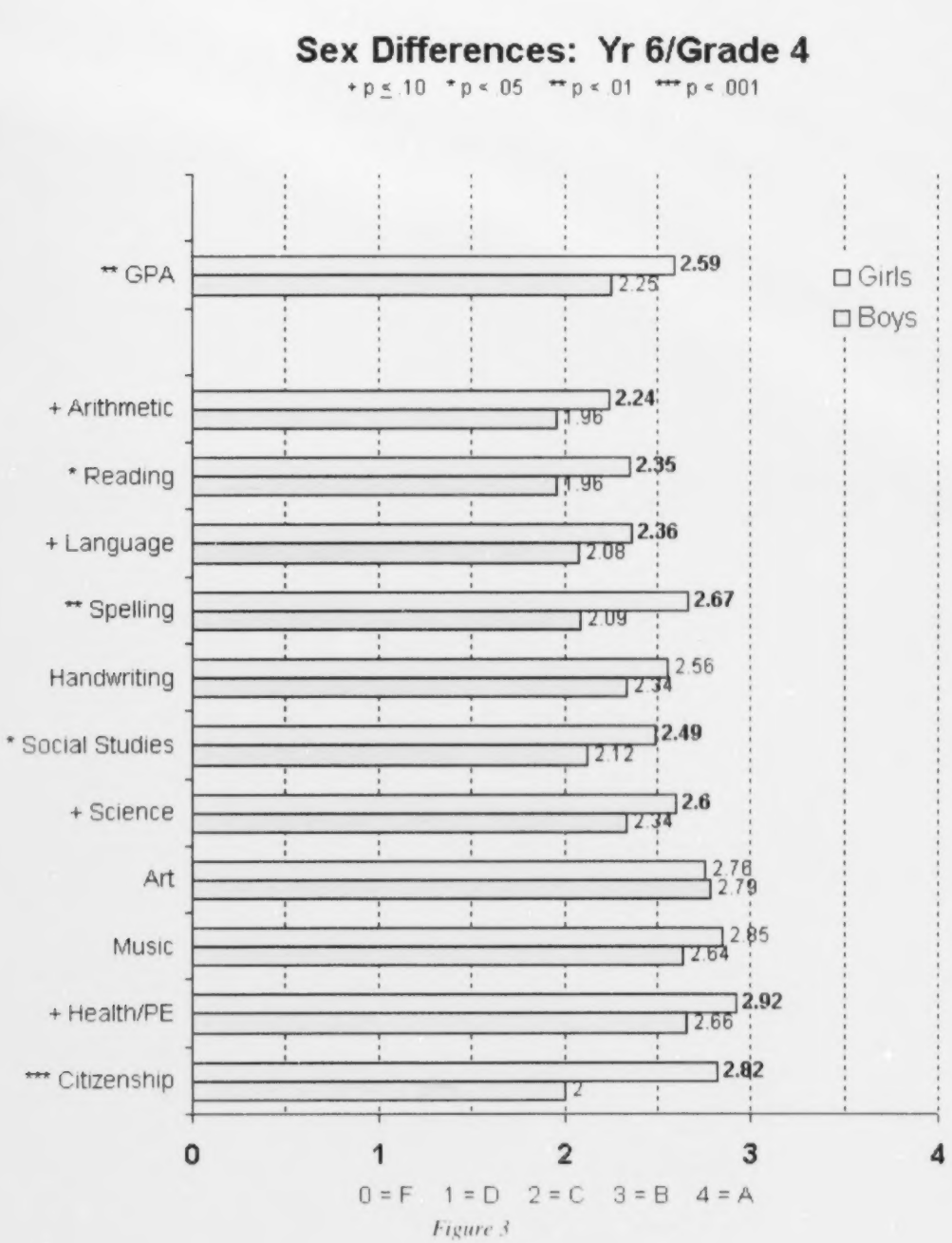

Figure 3

Interactions. No significant Preschool Model x Sex interactions were found for overall GPA or any of the 11 subject areas in Year 6. A possible interaction between preschool model and sex was found for Year 6 music grades, F (2, 153) = 2.59, p = .08. Unlike other boys, Model AD boys earned somewhat higher grades in music (6%) than did Model AD girls. However, at the end of children's sixth year in school, the smallest gap between school performance of boys and girls appeared for Model CI children. The GPA of Model CI boys was only 9% lower than that of girls, whereas a 16% and 14% difference between girls' and boys' GPA was found for Models M and AD, respectively.

Year 6 Summary. School performance of those who had attended academically directed

preschool classes was beginning to decline by the end of children's sixth year in school. Girls still outperformed boys in school, but this difference was now less noticeable among children who had attended child-initiated preschool classes. Teachers continued to rate school behavior of boys lower than that of girls. Although no significant differences attributable to preschool approach were found in behavior at the end of the sixth year in school, teachers continued to rate behavior of children with academically directed preschool experiences somewhat lower than their peers.

Transition from Year 5 to Year 6

A 3 x 2 x 2 (Preschool Model x Sex x Year) repeated measures multiple analysis of covariance (MANCOVA) with year as the repeated variable was used to test for differential effects of preschool model on children's grades, sex differences, and possible Preschool Model x Sex interactions across time (Year 5 to Year 6). As with previous analyses, the covariate used to control for possible influence of economic differences between children was eligibility for subsidized school lunch. Missing scores were not imputed.

Main Effect for Year. Although children's grades generally dropped as they left the primary grades and entered the later elementary school grades, no significant main effect for year was found in the subsample's overall GPA, $F(1, 132) = .88$, $p = .35$. Analyses of each subject area yielded only one significant main effect for year; subsample children's grades in language decreased 8% from Year 5 to Year 6, $F(1, 131) = 4.78$, $p = .03$. Effect size for this difference was small (.16).

Interactions across Years. Of greater interest in children's transition from the primary to the later elementary school grades was how an earlier preschool model or children's sex or both might differentially affect school performance across years. Therefore, two-way interactions (Preschool Model x Year; Sex x Year) and the possibility of a three-way interaction (Preschool Model x Sex x Year) were examined more closely.

As shown in Table 2 and Figure 4, there was a significant interaction between preschool model and year for GPA ($p = .02$). The GPA of Model CI children increased 6%, while GPA decreased 4% and 8% for Models M and AD, respectively. A similar pattern of Model CI increases and Models M and AD decreases was found in 6 of the 11 subject areas: reading, language, spelling, science, health/PE, and citizenship. In an additional three subject areas (arithmetic, art, and handwriting), Model CI grades either remained constant or increased. Model M grades increased in only one subject area, music. Model AD grades increased in only one subject area, handwriting. Finally, all three preschool models showed a drop in children's social studies grades from Year 5 to Year 6.

Table 2
ANCOVA Interactions for Preschool Model and Sex: Year 5 to Year 6

Model x Year	Sex x Year	Sex x Year	Model x Sex x Year
GPA	$F(2, 132) = 4.25$, $p = .02$	$F(1, 132) = .40$, $p = .53$	$F(2, 132) = .12$, $p = .89$
Arithmetic	$F(2, 130) = 3.37$, $p = .04$	$F(1, 130) = .07$, $p = .79$	$F(2, 130) = .32$, $p = .72$
Reading	$F(2, 130) = 3.19$, $p = .045$	$F(1, 130) = .07$, $p = .79$	$F(2, 130) = .27$, $p = .76$
Language	$F(2, 131) = 2.34$, $p = .10$	$F(1, 131) = .06$, $p = .80$	$F(2, 131) = .65$, $p = .53$
Spelling	$F(2, 131) = 3.38$, $p = .04$	$F(1, 131) = 4.17$, $p = .04$	$F(2, 131) = .16$, $p = .85$
Handwriting	$F(2, 131) = .71$, $p = .49$	$F(1, 131) = .13$, $p = .72$	$F(2, 131) = .93$, $p = .40$
Social Studies	$F(2, 129) = .15$, $p = .86$	$F(1, 129) = .00$, $p = .95$	$F(2, 129) = .11$, $p = .90$
Science	$F(2, 127) = .81$, $p = .45$	$F(1, 127) = .01$, $p = .91$	$F(2, 127) = 1.79$, $p = .17$
Art	$F(2, 109) = .34$, $p = .72$	$F(1, 109) = .12$, $p = .73$	$F(2, 109) = .86$, $p = .43$
Music	$F(2, 98) = .12$, $p = .89$	$F(2, 98) = .24$, $p = .62$	$F(2, 98) = .37$, $p = .37$
Health/PE	$F(2, 112) = 5.31$, $p = .006$	$F(1, 112) = 3.25$, $p = .07$	$F(2, 112) = 1.26$, $p = .29$
Citizenship	$F(2, 111) = 2.91$, $p = .06$	$F(1, 111) = .07$, $p = .80$	$F(2, 111) = 3.04$, $p = .05$

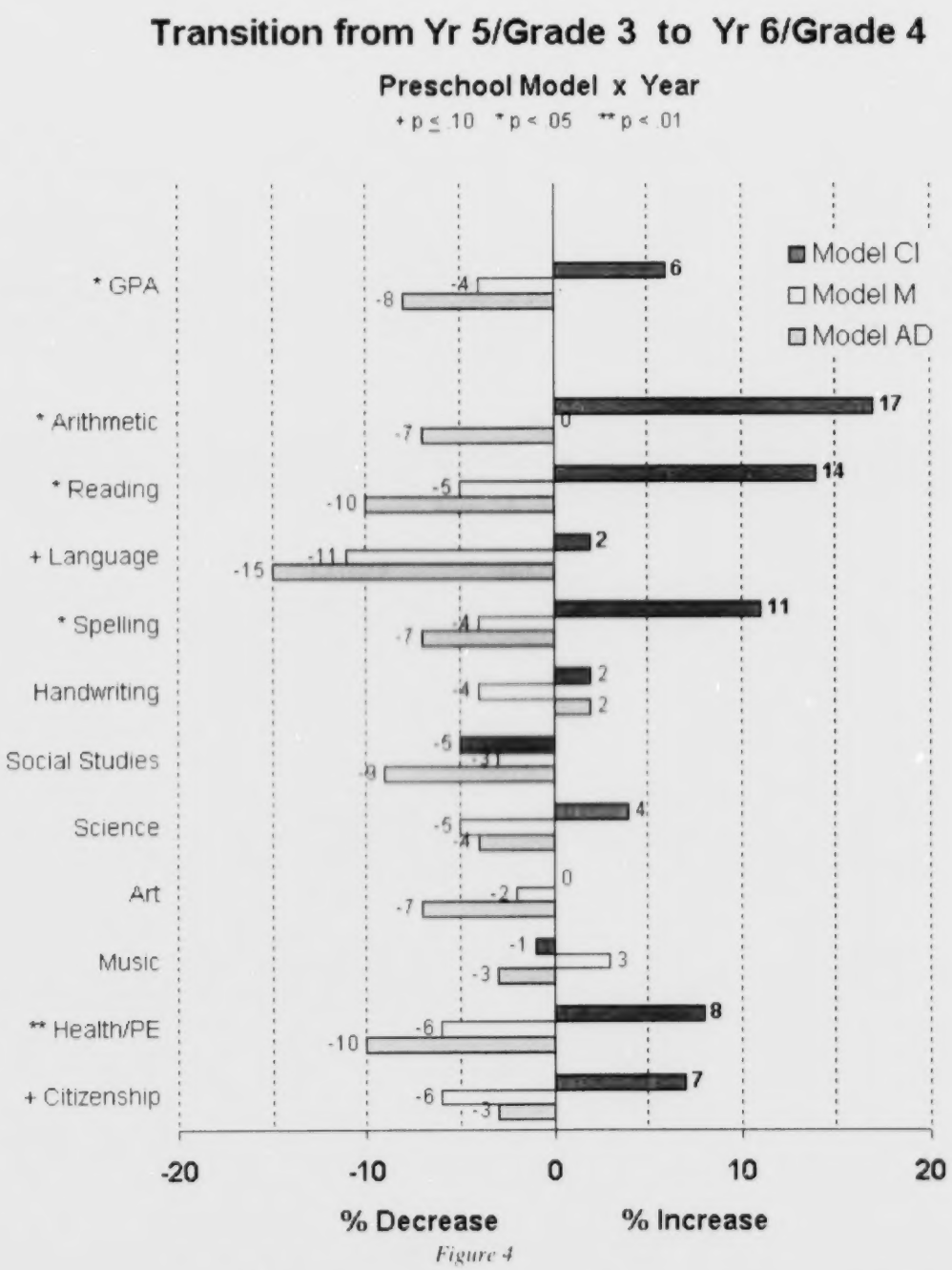

Figure 4

As shown in Table 2, four subject area Preschool Model x Year interactions were significant: arithmetic, reading, spelling, and health/PE. Statistical trends toward significant interactions were found for language and citizenship. Only one Sex x Year interaction was found to be significant. Girls' grades in spelling increased 3%, and boys' grades decreased. A somewhat similar pattern was found for health/PE grades ($p = .07$), with boys' grades decreasing 6% and girls' grades remaining constant in health/PE. This Sex x Year interaction pattern, however, was not typical of other subject areas.

Figure 5 shows increases or decreases in boys' and girls' grades across years for each preschool model. As seen in Table 2, citizenship was the only subject area to show a significant three-way interaction between preschool model, children's sex, and year ($p = .05$). Model CI boys and girls had similar increases in citizenship grades across years (8% and 6%, respectively). The overall decrease in Model M citizenship grades was due primarily to a 19% drop in boys' grades; Model M girls decreased only slightly (2%). Citizenship grades of Model AD boys increased 26%, while girls' citizenship grades decreased 7%. The source of boys' improvement was due primarily to fewer failing Year 6 citizenship grades among boys whose school deportment had been previously unacceptable. Even with this improvement, however, Model AD boys remained 11% behind Model CI boys in Year 6 citizenship grades. And, although improved, these Year 6 citizenship grades for Model AD boys still remained lower than citizenship grades of girls (33%, 32%, and 18% lower compared to Models CI, M, and AD girls, respectively).

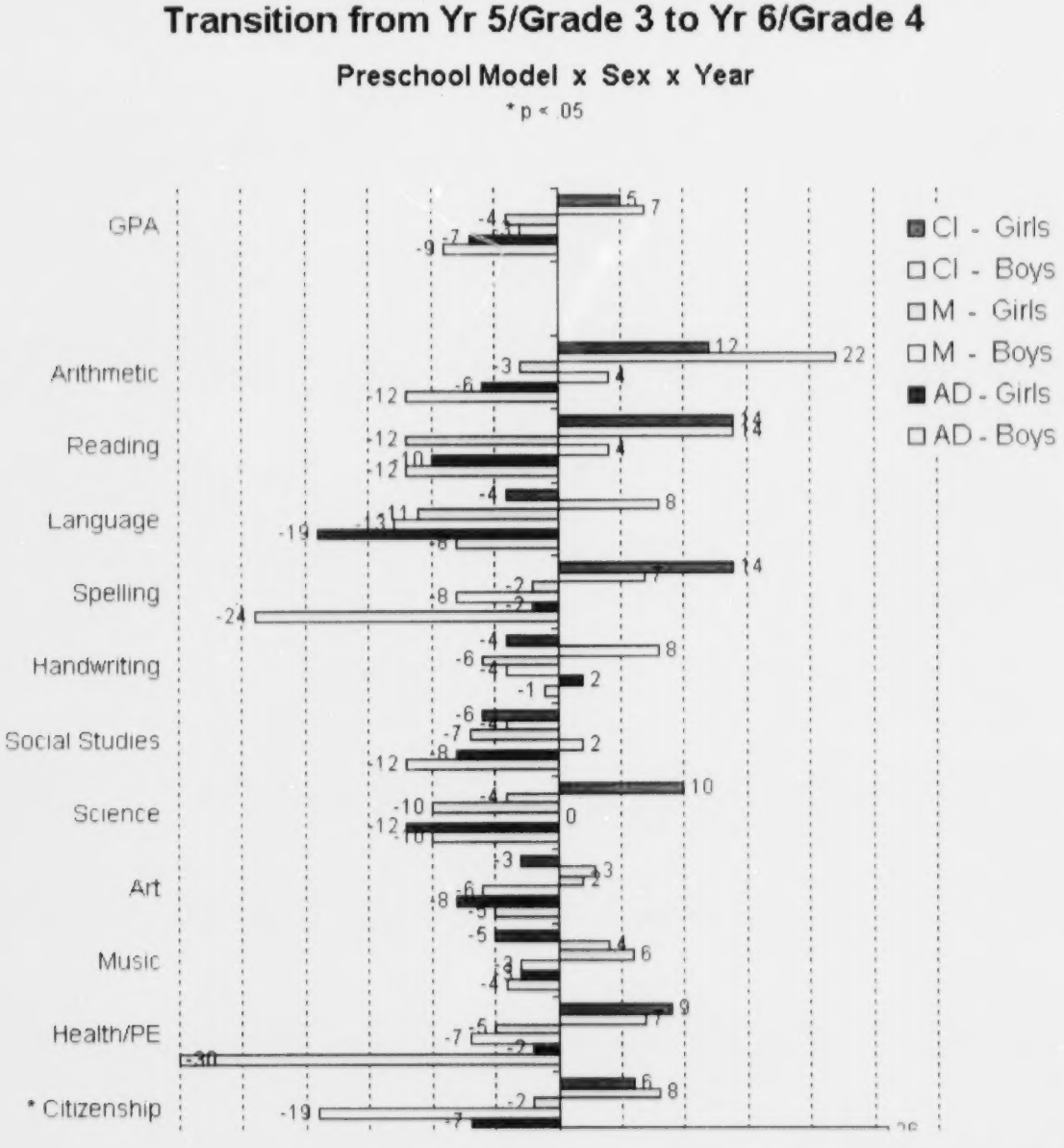

Figure 5

Discussion

As predicted, preschool model did have an influence on children's later school achievement. Children whose preschool experience was child initiated faired better than peers in the transition from the primary to the later elementary school grades. Not only were their overall grades following the transition significantly higher, their school performance improved or held constant in all but two subject areas (music, social studies) despite increased academic demands of the next grade level. Contrary to predictions, children from preschool classes where teachers had attempted to combine distinctive approaches were performing better in school than expected. By the end of their fifth year in school, they had "caught up" to classmates from other preschool models. Relative to peers, the position of children with combination approach preschool experiences was intermediary following the transition. Findings regarding later school success were somewhat mixed for children who had more didactic, academically directed preschool experiences. Although fewer of these children had been retained during the primary grades, children from this preschool model were least successful in making the transition to the later elementary school grades. Grades of children from academically directed preschool classrooms declined in all but one subject area (handwriting) following the Year 6 transition.

What contributed to the lower rates of retention prior to third grade among children whose earlier preschool experiences had been academically directed? One possibility is greater continuity between the preschool experience and what children encountered in this public school's kindergartens and primary grades. After preschool, these children were likely to enter a moderately academic kindergarten with more formal instruction practices in reading and arithmetic (Marcon, 1993). In fact, only 20% would have experienced a more socioemotional-oriented kindergarten in this school district, and virtually none of the first-grade classrooms that children entered would have resembled less academically focused preschools. Model AD children most likely had an easier transition to the primary grades. A second possibility involves family-related influences on early grade retention. Lower-income children in this follow-up study were more likely to have been retained prior to third grade. Children eligible for Head Start came from the lowest-income homes and in the setting of this study were likely to be growing up in single-parent families. No children eligible for Head Start in this study were enrolled in Model AD classes. Thus, lower retention of Model AD children could be more related to family income factors than to type of preschool experience. A third possibility is that grade-level placements may not fully reflect academic performance in a competency-based system of promotion that emphasizes basic reading and arithmetic skills. If mastery of critical skills in these two subjects was not demonstrated, children were automatically retained regardless of their performance in other subject areas. Likewise, children who demonstrated mastery of critical reading and arithmetic objectives were able to advance regardless of performance in other subject areas. Meeting basic competency requirements of the primary grades may not be sufficient to sustain later academic performance when "pulling it all together" requires more than just "adding up the pieces" children have acquired along the way. Children with academically directed preschool experiences may have missed out on the more integrative experiences of peers in other preschool models. Future research to investigate each of these

possibilities is needed.

By the end of the primary grades, there was little difference in the academic performance of children who had experienced three different preschool models. This finding was consistent with the developmental assumption that, by the end of third grade, most children will have attained the basic academic skills. Earlier limitations associated with a combination approach had been overcome, and children were generally academically comparable and on "even footing" when they entered the transition to the later elementary school grades. What happened on the other side of this transition? Why did academic performance of children from academically directed preschool classes begin to decline? The difference between their school grades and those of children from child-initiated preschools was not just statistically significant—the 14% difference in grades was of practical significance with children differing by more than a third of a standard deviation in overall grades. Perhaps the answer can be found in new demands characteristic of the later elementary school grades. Through the primary grades, children are learning to read. An academically directed approach typically emphasizes the act of reading over comprehension. Beginning in fourth grade, children are reading to learn; comprehension is critical. In fourth grade, they encounter more abstract concepts that do not necessarily match up with their everyday experiences. Additionally, fourth-grade teachers expect children to be more independent in the learning process, to assume more responsibility for their learning, and to show greater initiative. Perhaps teachers foster this independence by stepping back somewhat and shifting their instructional approach to be less didactic. It is at this point that motivation and self-initiated learning become crucial for children's later school success. This is the point at which Elkind (1986) and Zigler (1987) worried that short-term academic gains produced by overly didactic, formal instructional practices for young children would be offset by long-term stifling of children's motivation. Important lessons about independence and self-initiative are being learned in the early childhood years. Overly teacher-directed approaches that tell young children what to do, when to do it, and how to do it most likely curtail development of initiative during the preschool years. According to developmentalist Constance Kamii (1975, 1984), such an approach produces passive students who wait to be told what to think next. Therefore, it is not really surprising that children whose preschool experience may have curtailed initiative would find the transition to the later elementary school grades more difficult. The foundation of critical thinking may be found in early childhood experiences that foster curiosity, initiative, independence, and effective choice.

As predicted, earlier sex differences in school achievement favoring girls persisted both at the end of the primary grades and following the transition to the later elementary school years. Going into the transition, the smallest gap between boys' and girls' academic performance was seen among children who had attended preschool classes where teachers used a "combination" approach. On the other side of the transition, the smallest gap between the sexes was seen in children who had child-initiated preschool experiences. When academic demands increased, boys whose earliest school experiences involved active, self-initiated learning appeared to be better able to meet these new demands.

Although sex differences did not, as predicted, moderate the effect of preschool model across time, the closing of the academic gap between boys and girls following the primary grades was interesting. African American boys do not typically follow the academic pattern of boys in general by surpassing girls following the elementary school years. Might the boys in this predominantly African American sample whose preschool experience was active and child initiated break the pattern and pull ahead of girls, or at least stay close to girls, at the next major educational transition? Miller and Bizzell's findings (1984) suggest that this outcome is a

distinct possibility. And, if so, what is the underlying mechanism by which to account for such a possibility? How do cultural factors interact with and moderate the influence of various preschool models? The passivity required of children in an overly academically directed approach may be especially difficult for young African American boys. In the preschool years, girls' earlier maturation may have allowed them to better process the verbal instruction typical of didactic, academically directed instruction, whereas boys' generally slower rate of neurological development may have required a more active, "hands on" approach found in nondidactic, child-initiated early learning experiences. Lessons learned in the preschool years assuredly carry over into children's later school careers. The next academic transition, when children leave elementary school, will be especially interesting for understanding sex differences in academic performance of these low-income children.

Caution is warranted when interpreting this study's findings. First, and foremost, it is important to remember that the quasi-experimental design used in this research does not establish causality. Although parents did not choose their child's teacher or preschool model, neither did the researcher randomly assign children to preschool model at the beginning of this longitudinal study. This was a field study reflecting typical educational practices where children attend their neighborhood school. Second, because the research design is correlational, other intervening variables between preschool and fourth grade most likely contribute to these findings. For example, schools attended, as well as teachers and classmates, undoubtedly affect children's later school achievement. Additionally, the influence of family characteristics shown to positively affect educational outcomes of African American children (Luster & McAdoo, 1996) were not adequately examined in this study of intact groups. Only effects of family income and number of parents were investigated. Future research would be strengthened by greater attention to other family characteristics, such as parental beliefs, that are known to influence children's development (Sigel, 1985). Third, the follow-up sample did differ somewhat from the original in that it consisted of more minority children who were poorer and more likely to live in single-parent families than the sample originally studied. This difference, along with high attrition, was expected in a city where middle-class children often leave the public school system after kindergarten and children from highly mobile, lower-income families often relocate to a neighboring state. Because policy makers were interested in action research that could benefit children enrolled in their own school district, children who left this school system were not followed. Data from those who left the public schools would be interesting to examine. However, it is unlikely that these new data would have altered findings regarding the influence of preschool model because approximately equal numbers of children from each model were lost. Finally, use of individual children as the statistical unit of analysis, rather than school or classroom means, could limit generalizability of findings due to potential interdependence of grades for children in the same classroom. Unfortunately, even nested analysis of potentially nonindependent observations does not guarantee that statistical assumptions of independence of error will be met (Hopkins, 1982). The large number of schools (and hence of teachers) in this follow-up study reduces the possible effect of any particular teacher's grading practices on these findings. Concern about interdependence of grades assigned to children in the same classroom is also somewhat reduced by the competency-based grading system used in this school district. It is important to remember that the large number of schools and teachers sampled in this study enhances, but does not guarantee, generalizability of this study's findings.

Children's later school success appears to be enhanced by more active, child-initiated learning experiences. Their long-term progress may be slowed by overly academic preschool experiences that introduce formalized learning experiences too early for most children's developmental status. Pushing children too soon may actually backfire when children move into the later

elementary school grades and are required to think more independently and take on greater responsibility for their own learning process.

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The Role of Pretend Play in Children's Cognitive Development

Doris Bergen
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Abstract

There is a growing body of evidence supporting the many connections between cognitive competence and high-quality pretend play. This article defines the cluster of concepts related to pretend play and cognition and briefly synthesizes the latest research on the role of such play in children's cognitive, social, and academic development. The article notes that there is a growing body of evidence to suggest that high-quality pretend play is an important facilitator of perspective taking and later abstract thought, that it may facilitate higher-level cognition, and that there are clear links between pretend play and social and linguistic competence. The article also notes that there is still a great need for research on the relationship between high-quality pretend play and development of specific academic skills. The article concludes with a discussion of the challenges and potential policy directions suggested by research findings.

Introduction

Although play has been a well-established curriculum component in early childhood education, the increasing emphasis on accountability appears to have led to a corresponding decline in the general understanding of the important contribution that high-quality play—especially pretend play—can make to children's cognitive development in the early years. This article defines the cluster of concepts related to pretend play and cognition; briefly synthesizes the latest research on the role of such play in children's cognitive, social, and academic development; and discusses the challenges and potential policy directions suggested by these research findings.

Conceptual Relationships between Pretense and Cognitive Development

Because the development of pretense, receptive and expressive language, and mental representation all begin at approximately the same age (usually between ages 1 and 2), researchers have hypothesized strong conceptual relationships between these processes.

Pretend play requires the ability to transform objects and actions symbolically; it is furthered by interactive social dialogue and negotiation; and it involves role taking, script knowledge, and improvisation. Many cognitive strategies are exhibited during pretense, such as joint planning, negotiation, problem solving, and goal seeking. A major question of interest to researchers is whether the co-occurrence of these developing abilities is evidence of a reciprocal or a cause-effect relationship—that is, are pretense, language, and cognition all parts of an integrated, reciprocally developing system, or does children's experience with pretense have a causal effect on the development of cognitive and language competencies? Although the answer to this question is still under study, it is clear that pretense plays a vital role in young children's lives and that the period of its salience extends through the primary school years as well (Bergen, 1998). Recently a "cognitive theory of pretense" has been proposed (Nichols & Stich, 2000), which suggests that there is a "separate mental workspace" within the human brain that can explain the phenomenon of pretense. While no research has confirmed this theory, it serves to emphasize how important the play/cognition relationship is for humans and to point toward neuroscience collaboration possibilities in future research on this relationship. It is more likely that pretend play engages many areas of the brain because it involves emotion, cognition, language, and sensorimotor actions, and thus it may promote the development of dense synaptic connections (Bergen & Coscia, 2001).

Recent Research on Pretense and Cognition Relationships

The relationship of pretend play (especially socially interactive pretense) to cognitive development has long been a topic of research interest among educators and psychologists, and a number of studies conducted in the late 1970s and early 1980s supported hypotheses about this relationship. For example, early studies linked play to young children's mathematics readiness (Yawkey, 1981), linguistic/literacy abilities (Pellegrini, 1980), cognitive functioning and impulse control (Saltz, Dixon, & Johnson, 1977), representational competence (Pederson, Rook-Green, & Elder, 1981), and problem-solving skills (Smith & Dutton, 1979). Recent research has explored some cognitive components hypothesized to be strongly related to pretense, such as mental representation ability (i.e., theory of mind), problem solving and other cognitive strategies, social and linguistic competence, and academic skill development.

Theory of Mind Development

The possible relationships between pretense and the development of mental representation (Theory of Mind—TOM) have been studied extensively in the past decade. Derived from the view that pretense involves mental representation (Leslie, 1987) and from study of role-play as a form of perspective taking (Rubin & Howe, 1986), a series of experimental studies using children's understanding of false belief (i.e., inaccurate beliefs held by others) have explored pretense and TOM issues. Lillard (1998) has pointed out that pretense involves "out of play frame" negotiation between players with differing views, simultaneous representation of objects in two ways (real and pretend), role-play requiring acting out others' thoughts and actions, and portrayal of emotions appropriate to varied situations and actors—all of which suggest that pretenders have mental representation abilities. Using experimental versions of false-belief tasks, a number of studies have found that children do not exhibit the ability to recognize false beliefs until about age 4 or 5,

although they engage in object transformation and role taking in pretense at a much earlier age. Lillard suggests that younger children probably see pretend as an action not a mental representation. However, she recently has suggested that pretend play may function for children as a way to create a "Twin Earth" that allows them to participate in and reason about nonactual situations (Lillard, 2001). Most TOM studies have been conducted in laboratory settings, and some researchers have noted that younger children often show understanding of others' thinking and beliefs in their naturally occurring pretend play. Other researchers have used adapted experimental methods to clarify what aspects of TOM younger children may have.

For example, Joseph (1998), in a series of experiments that probed 3- and 4-year-olds' understanding of involuntary behaviors and those performed intentionally during pretend, concluded that 4-year-olds understood intention as a cause of action and that they did represent pretend behaviors mentally, not merely as actions. He asserted that Lillard's questions required more sophisticated reasoning that resulted in an underestimation of children's TOM. Cassidy (1998) found that more children are able to attribute a false belief to an agent when that belief is about something occurring in pretend play but that a "reality bias" influences their ability to respond correctly in nonplay situations. Abu-Akel and Bailey (2001), in a TOM study comparing tasks using indexical language references (e.g., least abstract) to symbolic language references (e.g., requiring abstraction), found that a higher percentage of 4-year-olds were successful in TOM tasks when indexical references were used.

In pretend play situations with parents, Kavanaugh, Eizenman, and Harris (1997) found that children of 2½ show independent agency (making replica persons do pretend actions) and intersubjectivity (having a shared understanding with another in a common activity). Sinclair (1996), using naturalistic examples, asserted that young children's ability to use deception indicates that they have a theory of mind at an earlier age than 4. In a longitudinal study, Jenkins and Astington (2000) observed children's joint planning and role assignments during social pretense and found that their level of TOM predicted the extensiveness of these abilities. They point out that a theory of mind is a gradual acquisition over the age period from 2 to 6. Although children's development of mental representation is an important cognitive achievement needed for academic skills such as reading comprehension and use of mathematical symbols, longitudinal studies exploring relationships between children's pretense, theory of mind, and literacy, mathematical, or other academic skills have not been reported.

This body of theory and research has raised many questions that need further exploration; it does suggest, however, that high-quality pretend play is an important facilitator of perspective taking and later abstract thought.

Problem Solving and Other Cognitive Strategies

A number of researchers have focused on the relationship of play to specific cognitive strategies such as self-regulation, narrative recall, divergent problem solving, and rule understanding. Following Vygotsky (1978), who theorized that young children use private speech in play to regulate their behavior, eventually transforming this private speech into self-regulation through internal thought, Krafft and Berk (1998) compared the private speech of preschool children in Montessori and traditional play-oriented programs and

found that more private speech occurred in the play-oriented setting, especially during pretend play with fantasy characters. They conclude that, at the preschool level, "make-believe play serves as a vital context for the development of self-regulation" (p. 637), contrasting their findings to those of Winsler and Diaz (1995), who found less private speech during unstructured spontaneous play (not focused on pretend play). They suggest that social pretense, which requires children to determine task goals and carry them out, provides more opportunities for self-regulating private speech than do less complex play settings and settings with tasks having predetermined goals and greater teacher direction. Studies of private speech conducted in primary grade settings have typically shown that during tasks, children do use private speech but that it diminishes by third grade as self-regulatory processes are gradually internalized. Probably because of the lack of play opportunities in primary settings, private speech use during pretend play has been studied only at the preschool level, and studies of the transition from private speech in play-oriented to task-oriented situations at the preschool level have not been reported.

In a study designed to explore cognitive change underlying pretend play and understanding of narrative structures, Kim (1999) compared 4- and 5-year-old children in conditions involving pretend play enactment of stories to conditions using storytelling only and found that children in the pretend play conditions used more elaborative narratives and had higher levels of narrative structure. Ability to use narrative is an important emerging literacy skill. Children in the study also had better narrative recall immediately after the pretend enactment and at a later time period when prompted by pictures and doll figures. Although pretend play facilitated recall of the complex narrative structures at the first two time periods, there was no difference in recall at a later time period when no prompts were used, and there was no difference in children's ability to answer encoding and inference questions. The researcher concluded, however, that pretend play did facilitate narrative recall and expression over shorter time periods.

In a meta-analysis, Fisher (1992) indicated that there is a body of evidence showing the effectiveness of play, especially sociodramatic play, in promoting problem-solving abilities. In order to clarify what types of play and problem solving were related and whether these relationships were unidirectional or reciprocal, Wyver and Spence (1999) looked at two types of problem solving (divergent and convergent), two types of divergent problem solving (figural and semantic), and a range of play types and play social levels. In one study (controlling for IQ), they found relationships between thematic pretense and semantic divergent problem solving and between cooperative play and both semantic and figural divergent problem solving. They then gave some children divergent problem-solving training (figural and semantic) and found that there was a significant increase in figural problem-solving ability and in thematic play for the trained group. They gave other children pretend play training (thematic/associative, thematic/cooperative, or cooperative/nonthematic) and found the thematic training groups increased in thematic play and in semantic problem solving, whereas the cooperative play groups increased in cooperative play and on both semantic and figural problem solving. The researchers concluded that there seems to be a reciprocal, rather than a unidirectional, relationship between problem solving and pretend play, with cooperative social play having a more general influence on divergent problem solving and thematic play having a more specific influence on semantic problem solving. They suggest further study of these complex relationships.

In an observational study, Curran (1999) investigated the rule structure used by 3-, 4-, and

5-year-old children in their social pretense. She identified both explicit rules that the children could articulate (e.g., play fair, take a role) and implicit rules that children constructed but usually could not articulate (e.g., engage others, continue the pretend sequence). If rules in the first set were broken, the play stopped, but with the second set, the rules were learned gradually by the less experienced players, and the "master players" tried to channel those less familiar with these rules to keep the play going. Curran suggests that the development of the implicit rules, in particular, requires both divergent thinking and comprehension of rule structure. These are skills required for school success.

This research evidence on problem solving and other cognitive strategies, while not extensive, does point both to implicit and explicit ways that high-quality pretense may facilitate higher-level cognition.

Social and Linguistic Competence

Because pretense involves language use and takes place in social contexts, many studies of pretense include information on social and linguistic competence, which are also vital for school success. In an extensive observational study of pretend play, Sawyer (1997) found that, rather than following a script, much of the preschool children's pretense involved improvisational exchanges and that implicit, in-frame play strategies were more successful than explicit, out-of-frame strategies. He provides rich examples of the skill children exhibit in using improvisation in pretense. The movement to complex social pretense does not occur smoothly for some children, however, as researchers studying the consequences of social or language difficulties on play and cognitive development have observed. For example, Rubin and Coplan (1998) report on a series of studies that followed children who exhibited nonsocial or "withdrawn" play behaviors during preschool; they found that early social withdrawal predicts peer rejection, social anxiety, loneliness, depression, and negative self-esteem in later childhood and adolescence, as well as having negative implications for academic success. The researchers state that in the U.S. culture, social withdrawal may have more negative consequences for boys, but that in cultures where passive, controlled, and reticent behavior is valued (e.g., China), the consequences of this behavior may be different. Gender differences in play may also affect kindergarten adjustment, with boys who have solitary-passive play behaviors and girls who have solitary-active play behaviors being rated as more poorly adjusted by teachers (Coplan, Gavinski-Molina, Lagace-Seguin, & Wichmann, 2001).

The process of play development may also be affected by socioeconomic factors. Observations at two time periods of the play of children participating in Title I preschool programs in 22 classrooms did not show the same increase in social pretense that is typically found over time in most preschool studies (Farran & Son-Yarbrough, 2001). In this study, the play state with the most positive relationship to quantity of verbal behaviors was associative play (in which children interact briefly), but over the two time periods, associative play decreased while parallel play (in which children play along side others but do not interact) increased. This trend was most evident in Title I preschool classrooms enrolling the largest proportion of children from low socioeconomic backgrounds. There was also no increase in the total amount of verbal interaction over the two time periods, a finding that is incongruent with most research. Because increased social pretense and language use were not observed, the researchers express concern that such preschools may "facilitate the behavioral introduction to the expectations of the public school environment

but may not provide the foundational understandings and experiences to keep those early successes from disappearing once the curriculum becomes more demanding" (p. 259).

Researchers studying children who have disabilities have pointed out the importance of social pretense for these children's development and the difficulties such children often have in engaging in social pretense. Odom, McConnell, and Chandler (1993) found that teachers reported that about 75% of children with disabilities need assistance with social skills. However, in a review of research on the symbolic play skills of children with language disabilities, Casby (1997) concluded that their actual differences in symbolic play abilities appear to be quite small; they have "a symbolic *performance* deficit more so than a symbolic *competence* deficit" (p. 477). That is, their capabilities for using symbolic ideas in play may be similar to children without language disabilities. Because of their language problems, however, they are less able to make their pretense themes and roles explicit in their play. Similarly, Guralnik and Hammond (1999) found that children with mild disabilities exhibit play transition patterns (i.e., from solitary to parallel to social) that are congruent with those of typical peers, although the transitions may occur slightly later. On the other hand, the social and pretend play patterns of children with autistic disorders are likely to differ from those of other children either because they lack the mental representation and the language competencies needed for social pretense or because they lack skill in generating novel schemas spontaneously (Jarrold, Boucher, & Smith, 1996). Hestenes and Carroll (2000) observed an inclusive classroom with approximately equal numbers of typically developing children and children with disabilities and found that those without disabilities engaged in more cooperative and less solitary play than did those with disabilities. Although both groups of children chose similar activities, typically developing children interacted less often with children with disabilities than expected. They suggest that, while effects of inclusive settings on play patterns of children with disabilities are not yet clear, such settings do not appear to disrupt the play of typically developing children. Special educators often use play intervention methods such as script rehearsal to promote young children's pretend play abilities, because of the hypothesized relationships between enhanced play skills and enhanced cognitive, social, and language development (Neeley, Neeley, Justen, & Tipton-Sumner, 2001).

In sum, research has shown some clear links between social and linguistic competence and high-quality pretense; thus, engagement in such pretense with peers may assist children's development in these areas.

Academic Skill Development

Numerous studies of literacy skill development through play, which embed literacy materials within play settings in preschool, kindergarten, and multiage programs, have typically shown increases in children's use of literacy materials and engagement in literacy acts (e.g., Christie & Enz, 1992; Einarsdottir, 2000; Neuman & Roskos, 1992; Stone & Christie, 1996). Using such a literacy intervention, Vukelich (1994) found that kindergarten children's ability to read print embedded in the environment was increased. In a longitudinal study, Bergen and Mauer (2000) found that children who had high levels of play with literacy materials in preschool were likely to be spontaneous readers of place signs and have greater pretend verbalizations in a "town-building" activity at age 5. Roskos and Neuman (1998) have pointed out that, although emerging literacy can be enhanced through play, further research comparing the efficacy of play-related literacy

approaches to other methods of increasing literacy skills is still needed, as are longitudinal studies.

Using a strategy similar to the literacy-embedding studies, Cook (2000) enriched preschoolers' pretend play settings with artifacts emphasizing number symbols and found that the children in the math-enriched setting engaged in more talk and activity related to mathematical concepts; however, the effects did not extend to more mature conceptual forms. Although not specifically focused on pretense, a longitudinal study in which preschool children were rated on the complexity of their block play (which has a high symbolic component) and then were followed into their high school years found (controlling for IQ and gender) positive relationships with seventh-grade mathematical test scores and high school measures of math grades, number of math courses, and number of honors courses (Wolfgang, Stannard, & Jones, 2001). The researchers speculate that the reasons no relationships were found with third- and fifth-grade test scores may be because of the "minimum skill and memorization" tests used in those earlier grades, and that when children developed formal operational thought processes by seventh grade, these might build on their early play experiences. They suggest that more researchers engage in "empirical longitudinal research for the positions taken in the support of play learning and curriculum" (p. 174).

There is still a great need for research on the relationship between high-quality pretend play and development of specific academic skills; however, perhaps because the typical school environment does not allow sufficient time for children to engage in extended themes of social pretense, this line of research has not been extensive.

Challenges and Policy Directions Suggested by Recent Research

Although earlier research on play/cognitive development relationships gave some support to play-based curricula in programs for children under age 5, it had little influence on kindergarten and primary schooling practices. More recently, due to state and national emphasis on proficiency test performance, even the small segments of social pretend play time that have been allowed (if not encouraged) in school, such as kindergarten "choice" time and recess breaks, are disappearing. The press for "academic readiness" through concentrated and direct teaching of alphabet, number, color, and other skills is now affecting the amount of time allocated for play in preschools. This trend has had a negative effect on social pretend play, which requires extended uninterrupted time periods to develop complexity. Thus, one major challenge for proponents of such play is to be able to articulate to policy makers how children's development of the types of cognitive skills that are demonstrated in pretense is as important (or even more important) for academic readiness and later school success than memorizing the standard set of information officially targeted as early childhood competencies. Even if play has not yet been demonstrated to be the cause of long-term school success, the evidence is very clear that it is an integrated coexisting component of young children's developmental progress. Further, because most tests now being designed for elementary-age children require strong representational skills, problem-solving abilities, and social-linguistic sophistication, proponents of play must be ready to demonstrate how the development of the cognitive skills exercised in pretend play are also essential for good test performance. Unfortunately, most of the present research evidence has come from small-scale cross-sectional studies that may seem irrelevant to educators and policy makers; therefore the other challenge to

researchers is to mount some more extensive and practice-oriented studies (preferably longitudinal) to investigate play/cognition relationships in diverse early childhood settings. Educators should resist policies that reduce time for social pretend play experiences in preschool and primary grades and work to increase funding for research on play/cognition relationships in early childhood.

In sum, there is a growing body of evidence supporting the many connections between cognitive competence and high-quality pretend play. If children lack opportunities to experience such play, their long-term capacities related to metacognition, problem solving, and social cognition, as well as to academic areas such as literacy, mathematics, and science, may be diminished. These complex and multidimensional skills involving many areas of the brain are most likely to thrive in an atmosphere rich in high-quality pretend play.

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Learning to Guide Preschool Children's Mathematical Understanding: A Teacher's Professional Growth

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Abstract

The National Council of Teachers of Mathematics emphasizes that young children need play-based opportunities to develop and deepen their conceptual understanding of mathematics. From a social-constructivist perspective, learning is more likely to occur if adults or more-competent peers mediate children's learning experiences. Emphasizing both the developmental and the curricular perspectives, this article focuses on the role of the teacher in guiding preschool children's mathematical learning while they play with everyday materials. Professional growth in three areas was identified as critical in teachers' learning to guide young children's learning of mathematical concepts. First is the ability to recognize children's demonstrated understanding of mathematical concepts, second is the ability to use mathematical language to guide their progress from behavioral to representational understanding of mathematical concepts, and third is the ability to assess systematically children's understanding of mathematical concepts. Checklists tracing the development of three fundamental mathematical concepts—one-to-one correspondence, classification, and seriation—are suggested as tools for teachers to monitor preschool children's learning of mathematical concepts and plan appropriate learning experiences within children's zones of proximal development. Creating an environment that is mathematically empowering and mediating children's experiences in this environment establish the foundation for constructing, modifying, and integrating mathematical concepts in young children.

Introduction

Laura has just finished reading the story "Goldilocks and the Three Bears" to her preschool class. She announces that it is now time for free play. Four-year-old Rachel looks around the room for a while and walks over to the dramatic play/housekeeping center. Today this center is equipped with dolls, other soft toys, cups, plates, plastic silverware, plastic food items, a table,

> *chairs, and some dress-up clothes. Rachel picks up an oversized shirt and slips her feet into "mummy shoes." She then brings out three stuffed bears of different sizes from the collection and places them around the table. As she seats the bears on three chairs, she mutters under her breath, "You are Papa Bear" (picking the largest bear), "you are the Mummy Bear" (picking the medium-sized bear), "and you are Baby Bear" (picking the smallest bear). Rachel then walks to the shelf and pulls out one plate and places it before Papa Bear; she walks back to the shelf to get a second plate and places it before Mama Bear; and then she makes one last trip to pick up a plate to place before Baby Bear. Next Rachel walks to the shelf and picks up a collection of spoons of different sizes. She is now joined by 5-year-old Tiffany, who tells her that the biggest bear needs the biggest spoon, the medium bear the medium spoon, and baby bear the smallest spoon. "Remember, like the bears story Ms. Laura read us." Rachel looks at Tiffany and then at the spoons, then randomly places a spoon before each bear. Tiffany immediately takes over and rearranges the spoons according to the size of the bears. Rachel watches for a few seconds and then walks away.*

Although observing a play episode like this one would not be unusual in many preschool classrooms, it had a particularly strong impact on how Laura understood her students' mathematical knowledge. As a new member of the local chapter of the National Council of Teachers of Mathematics (NCTM), Laura became particularly interested in the development of mathematical concepts in her students. She realized that the most remarkable growth of mathematical knowledge occurs between the pre-kindergarten and grade 2 levels and that it was especially important at this stage to focus on guiding children's development of fundamental mathematical concepts. Yet the lack of an agreed-on math curriculum for preschool made it difficult for Laura to decide which concepts were the most appropriate for her preschool children. Like many other teachers, Laura struggled to make sense of the development of her students' mathematical learning and relate it to her instructional decisions (Franke & Kazemi, 2001). She wrote in her journal:

> Teaching math has always been outside of my "comfort zone." Many commercial and teacher-made math games, including sets of animals, fruit, vehicles, shapes; board counting game; board classification games; and various spinners and large dice, are useful in reinforcing one-to-one correspondence, classification, and seriation. However, while used randomly and in isolation, these games may not help children fully grasp the math concepts they are built on. I have to go beyond providing some form of mathematical learning; I really need to have a well-thought-out math curriculum. I have tried math activities that I hoped would promote learning. I graphed with the children on a large mat. I had them each take off a shoe and decide by color where it should be placed. It was an activity that seemed to me that would be fun and hands-on, but the children were restless and bored. I set out small manipulatives with similar attributes and let the children explore and sort in bowls. I encouraged them to bring in leaf collections for the science table and discussed color and shape. Although the children were exploring the materials, I was challenged to find a way to assess what the children were learning and how to further develop their knowledge.

As is evident from this journal entry, Laura felt the need for a strong conceptual framework that would take into consideration the developmental characteristics of preschool children and would indicate environments that would foster children's natural mathematical abilities. Such a framework could help Laura to decide which mathematical concepts were appropriate for her students and the order in which they should be taught. Laura realized that these decisions needed to be based on her knowledge of the development of mathematical concepts and on an appropriate assessment of children's mathematical knowledge. She also realized

that preschool programs needed to expand and deepen the conceptual knowledge that young children have already developed by 3 years of age (Payne, 1990). The NCTM's (2000) new standards emphasize that all preschool children need opportunities to explore their world and experience mathematics through play. Knowing that, however, left Laura with more questions than answers. She wrote in her journal:

> How do I use play and play materials to enhance children's learning of primary math concepts? As a facilitator of learning, how can I engage the children in activities that would enable them to further construct mathematical concepts? What is the order in which math concepts develop? What are the primary math concepts and skills that preschool children need to develop in order to build a solid foundation for their later success in math in school? How do I ensure that I provide opportunities for each child as an individual to learn at his or her own rate? What kind of an ongoing assessment will be most helpful in planning developmentally appropriate math curriculum? How can I further expand the children's math knowledge and skills by improving my own practice and develop my knowledge in teaching mathematics?

Laura's observation of the play episode that involved Rachel and Tiffany helped her focus her work on the following specific questions:

- What mathematical concepts did Rachel and Tiffany exhibit during their play?
- How can I guide their learning so that their understanding of these concepts progresses to a higher level?
- Are other children in my class at the same stage as Rachel with regard to some of these concepts?

With these questions in mind, Laura began her master's project. Because we had a research interest in early learning of mathematical concepts, we became Laura's supervisors. At that time, our own research was at the stage of developing a series of teacher-friendly assessment tools that would facilitate curriculum planning in the content area of mathematics. This project was an exciting opportunity for Laura to deepen her understanding of young children's learning of mathematics. For us, Laura's project was as an opportunity to implement and document the use of these tools in a preschool classroom and to receive her feedback on their appropriateness and usefulness for an ongoing assessment of young children's development of primary math concepts. As Laura's supervisors, we were able to document, through observations and analysis of her journal entries, how her thinking about young children's learning of mathematical concepts developed, and how her understanding about the need to align curriculum, instruction, and assessment grew. In this article, we will focus on the main areas of growth in Laura's professional development that we believe could be helpful to other preschool teachers' growth.

Learning to Recognize Children's Demonstrated Understanding of Mathematical Concepts

The first and most important stage in Laura's professional growth was her enhanced ability to identify children's demonstrated understanding of mathematical concepts. Her observation of Rachel and Tiffany's reenactment of the story of "Goldilocks and the Three Bears" directed Laura's attention to the "impressive informal mathematical strengths " (Baroody, 2000, p. 61) that young children bring to the classroom. She saw that in this episode Rachel demonstrated her behavioral knowledge, that is, knowing how to enact procedures and roles and to implement several mathematical concepts (Katz & Chard, 2000). For example, choosing only the bears from a larger collection of dolls and plush toys demonstrated her behavioral

knowledge of the mathematical concept of classification. Providing a plate for each bear and a bear for each chair demonstrated her knowledge of one-to-one correspondence; ordering the bears in size from biggest to smallest showed her behavioral knowledge of seriation. Tiffany also demonstrated her behavioral knowledge of double seriation by rearranging the spoons to correspond with the size of the bears after Rachel had placed the spoons randomly. More important, however, Tiffany demonstrated her ability to verbalize what needed to be done so that each bear received the appropriate size of spoon. Laura's raised awareness of the mathematical context of the interaction between the two children helped her to recognize the different stages they had reached in the development of their knowledge of seriation. She also became aware that young children express their mathematical knowledge in a variety of contexts that are not necessarily related to "math activities." As a result, she could plan individually appropriate learning experiences for them as well as joint experiences where they could learn from each other. She could also encourage informal mathematical learning by creating a math-rich environment and engaging children in mathematical conversations as they interact with the environment.

Learning to Use Language to Guide Children's Construction of Mathematical Concepts

The next stage of Laura's professional growth was marked by a change in her understanding of the role of teachers in preschool children's learning of mathematical concepts. Traditionally, the emphasis in preschool settings has been on how concepts are acquired, not on what should be taught. Kagan (quoted in Jacobson, 1998, p. 12) pointed out, "We've approached [early education] more from developmental perspectives and not from curricular perspectives. We need both."

The constructivist paradigm based on Piaget's theory of cognitive development has long provided the theoretical framework for educational practice in which children acquired concepts through active involvement with the environment and constructed their own knowledge as they explored their surroundings. Applying this theory to mathematics has led to the use of manipulative materials that enable young children to count, engage in active learning, and develop concepts (Kaplan, Yamamoto, & Ginsberg, 1989). The teacher has been seen to take the role of providing a variety of materials and arranging an environment that is rich in materials and choices. However, in the revised version of the principles of developmentally appropriate practice (Bredekamp & Copple, 1997), the National Association for the Education of Young Children (NAEYC) leaders acknowledged that the emphasis on providing a variety of choices in the classroom and avoiding teaching children specific skills has been misinterpreted. As a result, in preschool settings, manipulative materials were typically used in a nonsystematic way that permitted double randomization: one to do with the appearance of the manipulative material per se and the other determined by variations in the readiness of the children to register them (Feuerstein & Feuerstein, 1991). This randomization may have prevented real conceptual learning from occurring for a number of children who could have otherwise been included in planned activities for learning. Although high-quality learning in the preschool years is often informal, this informality does not imply an unplanned or unsystematic program. Mathematics learning in preschools should be thought provoking, should include opportunities for active learning, and should be rich in mathematical language. More recently, the NCTM's (2000) standards addressed the issue of mathematical content, mathematical process, and the importance of introducing young children to the language and conventions of mathematics.

Thus the role of the teacher in active learning has been seen more recently as being crucial. The teacher is the facilitator who creates a learning environment that is mathematically empowering (NCTM, 1991). The theoretical framework that informed this change was Vygotsky's (1978, 1986) social-constructivist theory of cognitive development. In this theory, learning is more likely to occur if adults or older children mediate young children's learning experiences (Baroody, 2000). Vygotsky believed in a learning continuum characterized by the distance between a child's ability to solve a problem independently and his or her "maximally assisted" problem-solving ability under adult or more-experienced peer guidance. He called this area where real learning occurs the "zone of proximal development" (ZPD). The role of the teacher, therefore, is to provide "scaffold assistance" (Berk & Winsler, 1995), which entails a continual modification of the tasks so as to provide the appropriate level of challenge that enables the child to learn. The adult changes the quality of the support over a teaching session, adjusting the assistance to fit the child's level of performance (Berk & Winsler, 1995). Children learn through meaningful, naturalistic, active learning experiences. The adult must build on this knowledge and take the children to higher levels of understanding.

Having embraced the Vygotskian view of learning, Laura began to realize she must decide what further opportunities—not only materials, but more important, interactions—she needed to provide for Rachel, Tiffany, and the rest of the children in her classroom. Only then could she develop and expand their understanding of mathematics meaningfully. She wrote in her journal:

> I need to make the physical environment in my classroom more math rich. The furniture is child sized and easily adaptable to accommodate cooperative work. There is adequate and comfortable space on the partially carpeted floor to explore, construct, and work with concrete materials. Math materials and manipulatives are stored in clear bins on picture-labeled, open shelves and are in easy reach of the children. It is my intent now to increase the children's mathematical comprehension by assisting their construction of knowledge in one-to-one correspondence, classification, and seriation.

To guide children's learning of the concepts demonstrated during the free play episode, Laura began to see the need to become involved in a variety of situations that create a common language related to mathematics (Franke & Kazemi, 2001). For example, we were able to observe her daily discussions with children that involved comparisons of opposites during choice time. The children and the teacher talked about which blocks were bigger or smaller, which blocks fit into the shelves the best: small, medium, or large. They also made it a daily habit to discuss order: who was the first person in line, who was the second person in line, who was the last person in line or the caboose, the snack person.

Language allows the acquisition of new information as well as the appropriation of complex ideas and processes (Bodrova & Leong, 1996). Open-ended questioning can encourage expanded thinking. "What else?" and "I wonder what would happen if" can draw children's attention to new ways of thinking and interacting. Kamii (1982) explains that it is important to allow children who are constructing their own mathematical knowledge to do so without the teacher reinforcing the "right-ness" or correcting the "wrong-ness" of the child's answer. Disagreement with peers can help the child reexamine the correctness of his or her own thinking. Social interactions through group games are an excellent source of constructing new mathematical ideas and can lead children to make new connections and expand their own reasoning. This interaction helps them to become more independent and less reliant on the teacher as the sole source of answers.

If learning situations were organized and based on the developmental sequence of mathematical concepts, then the curriculum would reflect the children's present stage of understanding and would provide possibilities for further development at each child's pace. According to Katz and Chard (2000), understanding "how knowledge develops, what they [children] can understand, and how they understand their experiences as development proceeds is another basis for curriculum planning" (p. 26). Thus to take both Rachel and Tiffany from behavioral to representational knowledge (i.e., mental or symbolic representations of the concepts abstracted from direct and/or indirect experiences), Laura needed to carefully plan not only the physical layout of her classroom but most importantly her interactions with them so as to help their progress through the stages of the representation of mathematical concepts.

Learning to Assess Children's Understanding of Mathematical Concepts

Like most educators, Laura was looking for ways to improve the alignment of curriculum, instruction, and assessment. While working on her master's project, she began to think at a higher level about the connection between curriculum and assessment. She realized that if the purpose of assessment was to enable teachers to make appropriate decisions to improve students' understanding and learning of mathematical concepts, then her own deep knowledge of these key concepts, facts, principles, and processes was essential for planning appropriate curriculum and classroom experiences. Thus to be able to guide children's learning of mathematical concepts, she needed to be thoroughly grounded in the developmental sequence of the concepts the children learn. Only then could she assess the current level of children's understanding of mathematical concepts and plan experiences in their zone of proximal development.

Laura realized, however, that theoretical knowledge alone was insufficient for effective teaching; she would need appropriate tools to assess such learning. Assessment and documentation of children's work could help her plan developmentally appropriate and, more important, individually appropriate experiences that would promote children's learning. It is well accepted among early childhood professionals that observation is the most appropriate method of assessing preschool children and that play offers a perfect context for observing children and determining their knowledge and understanding (Garvey, 1990; Howes, 1992).

The following sections outline how Laura used the theoretical knowledge about the developmental sequence of mathematical concepts that were demonstrated by Rachel and Tiffany in the play episode to assess and guide all the students' learning of these concepts. These concepts are (1) matching and one-to-one correspondence, (2) sets and classification, and (3) order and seriation. Children's development of these concepts progresses through several stages. We compiled these stages in a checklist, and Laura used this checklist in her work.

Concept #1: Matching and One-to-One Correspondence

As discussed above, Rachel's placing of one plate for each bear demonstrated her understanding of the concept of matching and one-to-one correspondence. Typically, children between 2 and 4 years of age develop this understanding through the relationships of

"more-less-the same" (Brush, 1972; Gelman & Gallistel, 1978). Matching is a prerequisite for conservation; it is one of the earliest mathematical concepts to develop and forms the foundation for the development of logical thinking. One-to-one correspondence is the fundamental component of the concept of number. It is the understanding that one group has the same number of things as another. It is preliminary to counting and basic to the understanding of equivalence and the concept of conservation of number (Charlesworth & Lind, 1999; Montague-Smith, 1997). Once children understand basic one-to-one correspondence, they can apply this concept to higher-level activities that involve equivalence and the idea of "more or less" (see Appendix I).

Using the checklist, Laura was able to identify the stage of Rachel's understanding of the concept of one-to-one correspondence as being at "matching even sets of items that are related or go together but are not alike." To support and guide Rachel's learning to the next level of the same concept, Laura provided opportunities for her to match uneven sets of five or more items. She used every opportunity to join Rachel in the housekeeping play area. Using everyday objects (both in even and odd quantities) with which Rachel was familiar, like cups and saucers, spoons and forks, shovels and pails, or sets of plastic animals, Laura was able to identify Rachel's ability to match items that are alike or not alike. When Rachel's use of these materials did not indicate a clear pattern, Laura asked specific questions. For example, Laura brought in some plastic animals to add to the teddy bears and used small containers. At an opportune time in play, she asked Rachel to find one animal for each container. After repeated interactions of this nature, Laura observed Rachel playing at the water table, placing one frog on each plastic leaf in the water. Laura also noted that at the snack table Rachel carefully placed a cup next to a paper napkin for each child.

To take Rachel from behavioral to representational knowledge, Laura was careful to use language related to the concept of matching and one-to-one correspondence. Rich social interactions with teachers and more-competent peers can contribute to children's opportunities for learning and developing behavioral knowledge into representational knowledge. Children's ability to use words such as not enough and too many would show the highest level of their understanding of matching and one-to-one correspondence. The use of children's literature also facilitated the development of language related to mathematical concepts.

Because one-to-one correspondence means that one group has the same number of things as another, Laura's goal was to help not only Rachel but all the children in her classroom to see the relationship in any set of materials. As a result, Laura converted clean-up time to an important "math time" by introducing a matching game. She asked the children to place one object in a container or on a shelf. In doing this activity, they were to match object to object, object to picture, and picture to picture (see Appendix I). She also introduced various commercial games and teacher-made matching activities available to the children at choice time. The teacher-made activities included baskets of small objects, divided trays, tongs (optional, depending on the individual child's fine motor skills), and a one-through-three or one-through-six die. These activities introduced the concept of matching: one object goes into one section of the tray. One of the activities that Laura's children really enjoyed was taking marbles from a basket with a melon scoop and putting one marble in each compartment of an ice cube tray. Laura wrote in her journal, "This activity is so popular that I have to take names for a waiting list for those children who want to do the marble game over and over."

As the children became more proficient in their one-to-one-correspondence skills, Laura introduced grid and short path games. Grid games are bingo-type cards (without letters or numbers) used in combination with dice or spinners and counters (Moomaw & Hieronymus, 1995). Teddy Bear Bingo and Candy Land Bingo are examples of commercial grid games. These games allowed Laura to observe the different levels at which the children were with regard to the level of development of matching and one-to-one correspondence. For some children, counting the pips on the dice was a challenge; they either double-counted or skipped pips. Rachel, for example, counted six as " one, two, three; one two three." For others, counting did not present a problem. They were even able to use mathematical language to not only explain what they were doing but also to predict what they needed to win the game. Megan said, "I got six, now I only have three more to go," and Tiffany said, "One and two is three, now I need four more." Having observed Tiffany, Laura asked her if she would like to play the grid game with Rachel. Tiffany, who enjoyed the game tremendously and was looking for all available opportunities to play it, readily agreed. During the interaction between the two children, Tiffany said to Rachel, "This is not how you count these! Look. You go like this (pointing to each pip with a pencil and saying one, two, three, four, five)." After several repetitions, Rachel was able to count on her own to six.

In path games, children roll a die or dice to advance a mover on a path of distinctly separate spaces. Moomaw and Hieronymus (1995) assert that "path games incorporate the thinking strategies needed for grid games at a more difficult level and place additional emphasis on social interactions with teachers and peers" (p. 117). The first short path game covered the path with bingo chips to help the squirrel find some nuts. The one-through-six dice were used (Figure 1). All of the children were able to understand the concept of the short path game with a start and finish.

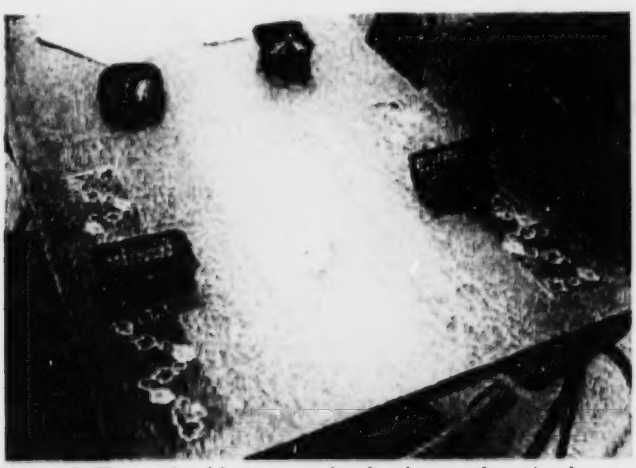

Figure 1. The math table is set up for the short path squirrel game.

The next short path activity was more complex. The snake game used unifix cubes as counters and used the one-through-six spinner. The snake game was more difficult for the children who had not yet mastered the ability to match uneven sets with five or more items. Rachel, for example, had difficulty matching the unifix cube with its corresponding square. The squares followed an "s" shape, and the shape confused her. She skipped squares and lost count when she was adding cubes. She could not finish the game. Tiffany, on the other hand, was already able to predict, "I have three, and now I just need one more!" She also counted squares to see how many she had left before she was finished. She played the game several

times with great enthusiasm. Knowing that Tiffany was successful in helping Rachel learn how to count the pips on the dice to six, Laura once again ask her to play with Rachel. This time Tiffany used a different strategy to show Rachel what she needed to do. She said, "Rachel, you just put your finger on the next square and then move the cube." Although Rachel learned quickly how to follow the curved path, recognizing the numbers on the spinner remained a problem. Tiffany decided that she would have to tell her how many squares she needs to move her cube. Rachel was happy to have Tiffany help her.

Concept #2: Early Classification: Creating Sets

In her reenactment of the story of Goldilocks, Rachel demonstrated her understanding of classification when she saw the sameness of the bears regardless of their size. According to Sugarman (1983), "Classification exists when two or more discrete events are treated as equivalent" (p. 4). This classification leads to the recognition that one group of objects is part of a larger group. However, some people may treat some objects or groups of objects as equivalent for different reasons.

Using the checklist, Laura determined that Rachel had behavioral knowledge of classification by association and that she demonstrated some knowledge of class inclusion. Thus to guide Rachel's learning of this concept, Laura needed to engage Rachel in an activity that would help her understand the concept of class: inclusion. Snack time presented such an opportunity. While making a fruit salad, Laura asked Rachel, "We have apples and bananas in this fruit salad; could we add any other fruit?" Clean-up time also provided Laura with an opportunity to ask Rachel to put all the animals in one box. A few days later, the children were pretending to go on a picnic, and Laura overheard Rachel tell the children, "We need to put all the food in the picnic basket." As one of the other children put the food in the basket, Rachel picked up a variety of toys and placed them in another box to take to the picnic. During the "picnic," Laura "accidentally" placed a ball in the picnic basket, and she was reprimanded by Rachel, who said, "That does not go in the picnic basket."

Laura realized that at each of the levels of the development of the concept, it was important that she talk to Rachel and ask her to describe and then explain what she had done. Vygotsky believed that children become capable of thinking as they talk (Bodrova & Leong, 1996). When a child demonstrated behavioral understanding of a concept and described what she or he had represented, Laura made sure that she talked to the child to determine that she was also able to explain her actions. This discussion ensured that the child had truly understood the concept and was not merely repeating words with no real understanding. The use of language in shared activity allows the child to construct meaning and also to demonstrate a higher level of understanding of the concept.

Most very young children have the ability to classify objects. However, young children do not necessarily know the names of colors, shapes, materials, and so forth. This lack of vocabulary may be mistaken for lack of knowledge or ability to classify by one attribute. So the teacher should ask young children to classify not using a specific color or shape but rather using general questions such as "Can you find something that is the same color (or shape or size or material, etc.) as this one?" By the time children demonstrate that they can classify by two or more attributes, they have already acquired the vocabulary to describe the specific characteristics of the object. So it is then appropriate for the teacher to ask the children, "Can you find something that is red and long?"

To help Rachel develop the ability to classify by function or association, during clean-up time Laura asked her, "Can you put the things that you draw with together in this box, please?" or "Can you find in the play center all the things a doctor uses and put them in one place, please?" During dramatic play, Laura asked the children to gather everything necessary to set up a grocery store so that Goldilocks could buy more groceries to make porridge for the bears. Although it is not typical for preschool children to have a clear understanding of class inclusion and exclusion, when asked specific questions, some may demonstrate partial understanding of the concept. They are particularly likely to understand when class inclusion is related to personal experiences such as visiting a doctor's office, going to the grocery store, or gardening with a parent (see Appendix II).

Graphing is a more complex way of classification. Simple group bar graphs are developmentally appropriate for preschool and enable the children to work together and learn from each other. Bar graphs that distinctly display information give the children practice in creating and comparing sets:

> A good graph arises out of the children's natural desire to share information with their peers, quantify the results, and compare the outcomes. Graphs can be especially motivating to cognitively advanced children since they provoke a high level of thinking. (Moomaw & Hieronymus, 1995, p. 170)

As Halloween approached, Laura engaged the children in graphing based on predictions. She introduced pumpkins with a graph titled "How Do Pumpkins Grow?" (Figure 2). Pumpkins growing various ways illustrated the choices: on a pumpkin tree, on a pumpkin bush, on a vine, or under the ground. The children's names were on cardboard rectangles and available for them to choose. Laura called the children over individually and presented each choice again and asked them to put their name by how they thought pumpkins grew.

This activity showed again that young children think differently or do not have knowledge assumed by adults. The majority of the children chose correctly that pumpkins grew on vines. Sid, however, stated, "Pumpkins grow underground like potatoes." Jamie also chose underground but could not explain her choice. When questioned, she said, "Because they [pumpkins] do." After the children and the teacher completed their discussion, Laura showed the class some pictures of a pumpkin patch and pumpkins on a vine. She asked if anyone could see how the pumpkins were growing. All the children agreed that pumpkins did indeed grow on vines.

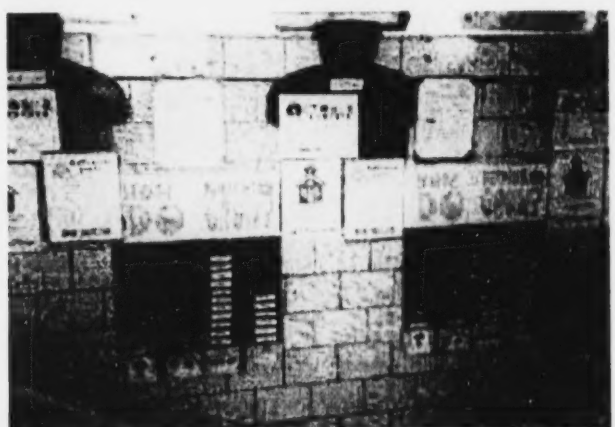

Figure 2. Graphing display of "How Do Pumpkins Grow?"

Concept #3: Order and Seriation

In the play episode described above, Rachel also demonstrated her behavioral understanding of seriation by systematically placing the bears from largest to smallest. Ordering is a higher level of comparing (seeing differences) and involves comparing more than two objects or more than two sets. Ordering or seriation involves putting more than two objects or sets with more than two members into a sequence. Ordering also involves placing objects in a sequence from first to last, and it is a prerequisite to patterning. Ordering is the foundation of our number system (e.g., 2 is bigger than 1, 3 is bigger than 2, etc.).

Laura saw from the checklist that the next stage in the developmental sequence of that concept is double seriation. During the play episode, Rachel did not understand this concept, as she demonstrated when she placed the spoons randomly and not according to the size of the bears. In fact when the older child, Tiffany, reminded her that the biggest bear needed the biggest spoon, Rachel ignored her, and when Tiffany continued, Rachel walked away. Stories like "Goldilocks and the Three Bears" are frequently used to illustrate the concept of double seriation. Yet because Rachel did not grasp the concept from the first reading, Laura decided to provide cups and spoons, animals, and bowls of various sizes that could be used for double seriation. Later in the school year, Laura noticed Rachel explaining the concept of double seriation to Emily in the same way that Tiffany had attempted to explain the concept to Rachel. Laura heard Emily finally exclaim, "I get it—the big bowl goes with the big dog!" Competent peers can model concepts and guide learning for the less-competent child during shared activities. Shared activity forces the participants to clarify and elaborate their thinking (Bodrova & Leong, 1996).

Laura also engaged all the children in learning experiences that could help them gain both behavioral and representational knowledge of the concept of order and seriation. These included asking children to line up by height before going out to play, putting characters in their paintings according to their size, seriating sounds from loudest to softest, and coloring objects according to their hue from lightest to darkest or vice versa. Sequencing of events while on a field trip was another learning experience Laura provided for her students that was related to understanding seriation. In addition, Laura was conscientious about using mathematical language when the children were playing with blocks, nesting cups, and so forth. Some specific questions she asked were, "Can you find a block that is smaller than this?" or "Can you find something that is bigger than this cup?" While playing with toy vehicles, she asked the child to put the cars in order from biggest to smallest or smallest to biggest. Laura also brought to the classroom her own collection of 17 pinecones—from giant Sequoia cones from California to very tiny pinecones from sapling evergreen trees. The children were excited to learn where she collected them and how the different types of pine trees have different-sized pinecones. They enjoyed putting them in order from the smallest to the biggest and vice versa. Although most children used trial and error to put them in order, almost all of them were able to seriate at least 9 of the cones from biggest to smallest. One child was even able to seriate all 17 of them. Seriating in reverse order was more challenging and needed a lot of verbal cueing on the part of the teacher. The inclusion of vocabulary like first, second, third, and so forth helped the children to develop representational knowledge of seriation (see Appendix III).

The Use of the Checklists

When teachers continually monitor and evaluate children's understanding, they can build on the children's knowledge in contexts that are meaningful to the children. The checklists provided a means for charting children's understanding of some mathematical concepts in Laura's preschool classroom. Laura used these checklists not to evaluate or determine mastery but to gather information that could be used for curriculum development. She used these checklists to identify the specific stages of development of the concepts in each child and then to plan appropriate materials and learning experiences to scaffold children's learning in the zone of proximal development of that concept. Laura was careful to note that in addition to demonstrating behavioral understanding the children were also able to describe and explain their actions. Children's explanations of their actions helped Laura determine that there was true understanding of the concept and that they were not merely repeating words without real understanding. The ongoing assessment allowed her to monitor individual children's progress and thus focus on guiding children's learning of these concepts. The checklists helped Laura make decisions about providing developmentally appropriate activities for the children she worked with. She wrote in her journal:

> The checklist helped me arrange my lessons in a logical manner from simple to more complex. I learned to be a careful observer and listener to the children not only at the math table but also during free choice and playtime. I was able to adjust to children's individual needs in various pre-math activities. I aligned curriculum and assessment to give me a more solid grasp of the stages of development of the mathematical concepts of matching and one-to-one correspondence, classification, and seriation.

Systematic yet flexible use of checklists in any preschool classroom can facilitate teachers' decision making about how to set up the classroom, what questions to ask, and what resources to provide for the development of each child (Helm, Beneke, & Steinheimer, 1997). Like Laura, other teachers can use these checklists while observing small groups of children working together or individual children participating in an activity. The checklists can also be used for individual interviews to assess children who do not demonstrate understanding while working independently or in groups. In addition, the checklists can be used for performance assessments to determine how children carry out specific tasks that replicate real-life experiences (Billman & Sherman, 1996).

Teachers can use the checklists as frequently as they consider necessary to chart children's development and understanding of concepts. To determine the level of understanding at the beginning of the year, the checklist can be used in the first few weeks of the program. It would be helpful to carry out this assessment for all children during free-choice activities. The role of the teacher could then be to provide a variety of materials that enable the children to demonstrate spontaneously and naturally their behavioral knowledge of mathematical concepts. This initial information could then be used in deciding what experiences could be helpful for individual children and for small groups of children who need similar experiences. After providing opportunities for children to demonstrate their behavioral knowledge through active involvement with materials, teachers need to interact with the children. When teachers use the language of mathematics in such interactions, children are helped to progress from one level of behavioral knowledge to the next, or from behavioral to representational understanding of the concept. Laura noticed that the children's overall increased awareness of math led to many more spontaneous uses of math skills in the classroom. She recorded in her journal:

> Plastic animals were classified and seriated. Colored blocks were used to make intricate geometric patterns. The building blocks were used in increasingly more complex ways. Building with blocks at the beginning of the school year was single-leveled and linear. As the project progressed and the children became more proficient, building with blocks became multileveled and more abstract. The calendar numbers were counted many times during the day with more-able children helping their less-able friends identify the names of number symbols. This increase of mathematical awareness carried over to some children's homes. Several parents told me that their children had become very interested in math outside of school. Megan's mother, for example, told me that she was patterning "everything": the family's shoes, cans in the cupboard, cereal, candy, and even her little brother's toys.

Periodic and systematic use of the checklists is necessary for monitoring the development of the concepts in each child. Dating observations while using the checklists provides a record of each child's growth and development and helps identify children with similar levels of understanding at any given time. This process informs the teacher's decisions about the need to guide the learning process for each child. "Quality assessments inform instructional decisions and allow teachers to monitor individual children's progress while focusing on how children are thinking about mathematics" (NTCM, 2000, p. 6). When teachers know what mathematical concepts they wish children to understand and the stages through which they develop, they can plan meaningful learning experiences and assess children's progress (Richardson & Salkeld, 1995). As teachers plan for children's development, they must also take into consideration children's interests and stages of development. It is critical to allow children time for free play that enables them to explore mathematical concepts. While children are engaged in an activity, the teacher can observe and then become active in guiding their learning. This interaction will help the children's progress from behavioral to representational understanding of mathematical concepts. Thus the flexible yet systematic use of the checklists provided here can facilitate preschool teachers developing children's mathematical knowledge. They also provide a means for the teachers to systematically examine their own practice and make informed decisions about meeting individual children's mathematical learning needs. The following journal entry clearly communicates Laura's own sense of professional growth:

> During this project, I developed skills as a researcher. I systematically studied my own practice and made many adjustments to accommodate my newfound mathematical abilities. I became adept at planning lessons and producing developmentally appropriate math activities for children. As I became more knowledgeable and I gained some confidence, I began to develop my professional voice. Most of the children, their parents, and the administration of my school very enthusiastically received the entire project. The children's excitement about math was continuous.

Acknowledgment

All quotes from the teacher's journal are included with her permission.

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Appendix I

Checklist for Preschool Pre-mathematical Concepts Matching and One-to-One Correspondence

Name of the Child _____

Concepts/Stages of Development	Sept.-Oct.	Dec.-Jan.	April-May
Matching related items that are not alike			
1. Matches different but related items that are not alike			
2. Matches even sets—with 5 or fewer items			
3. Matches uneven sets with 5 or more items			
4. Uses appropriate vocabulary while matching sets (e.g., too many, not enough)			
Matching similar items			
5. Matches 2 similar items			
6. Matches even sets—with 5 or fewer items			
7. Matches uneven sets—with 5 or more items			
8. Uses appropriate vocabulary while matching sets that are alike (e.g., too many, not enough)			

KEY TO CHECKLISTS

✓	Demonstrates behavioral knowledge of the concept
✓✓	Demonstrates behavioral and representational knowledge of the concept
0	Demonstrates partial behavioral knowledge of the concept
00	Demonstrates partial representational knowedge of the concept
X	Does not demonstrate any kind of knowledge of the concept

Appendix II

Checklist for Preschool Pre-mathematical Concepts
Sets of Classification

Name of the Child _____

Concepts/Stages of Development	Sept.-Oct.	Dec.-Jan.	April-May
1. Able to group identical objects			
2. Sorts objects by 1 attribute—color, shape, size, material, pattern, texture			
3. Classifies by 2 attributes			
4. Classifies by 3 attributes			
5. Describes what has been done while classifying by 1, 2, or 3 attributes			
6. Explains what has been done while classifying by 1, 2, or 3 attributes			
7. Classifies according to function			
8. Describes and/or explains what has been done			
9. Classifies according to association			
10. Describes and/or explains what has been done			
11. Understands class exclusion			
12. Understands class inclusion			
13. Describes and/or explains what has been done			
14. Classifies by number			

KEY TO CHECKLISTS	
✔	Demonstrates behavioral knowledge of the concept
✔✔	Demonstrates behavioral and representational knowledge of the concept
0	Demonstrates partial behavioral knowledge of the concept
00	Demonstrates partial representational knowedge of the concept
X	Does not demonstrate any kind of knowledge of the concept

Appendix III

Checklist for Preschool Pre-mathematical Concepts

Order and Seriation

Name of the Child _____

Concepts/Stages of Development	Sept.-Oct.	Dec.-Jan.	April-May
1. Comparison of opposites (e.g., long/short, big/small, etc.)			
2. Orders 3 objects in random order			
3. Orders 3 objects by trial and error			
4. Orders 3 objects in a systematic manner			
5. Seriates in reverse order			
6. Performs double seriation			
7. Describes what has been done			
8. Explains what has been done			

KEY TO CHECKLISTS	
✔	Demonstrates behavioral knowledge of the concept
✔✔	Demonstrates behavioral and representational knowledge of the concept
0	Demonstrates partial behavioral knowledge of the concept
00	Demonstrates partial representational knowedge of the concept
X	Does not demonstrate any kind of knowledge of the concept

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Demographic Characteristics of Early Childhood Teachers and Structural Elements of Early Care and Education in the United States

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Abstract

This paper summarizes demographic information on early childhood programs and teachers of 3- and 4-year-olds. Questionnaires were sent to a random sample of early childhood programs across the United States. Data were collected on teacher characteristics and structural features of early childhood programs (enrollment, class size, hours of operation, and ratio of teachers to students). Results indicate that there are approximately 284,277 teachers of 3- and 4-year-olds in the United States. The vast majority of these teachers are women, and 78% are White. Approximately 50% of these teachers have earned a college degree, although educational attainment varies among program types. For-profit centers currently outnumber other types of centers, although the number of early childhood programs in public schools is increasing rapidly. The findings will be of interest to parents because they must choose among different program types when selecting a setting for their children, and it is therefore important for them to have access to information about the characteristics of early childhood programs and teachers. Additionally, policy makers need to understand the distinctions that exist between different types of early childhood settings as they adopt regulations and make funding decisions that affect parental choice of programs.

Introduction

Over the past three decades, the number of children in early childhood programs before kindergarten has been increasing. Currently, more than 65% of mothers with children under the age of 6 are in the labor force (U.S. Department of Labor, 2001). According to data from the National Center for Education Statistics, in 1995, 67% of 3-year-olds and

77% of 4-year-olds spent some amount of time each week in nonparental care (Hofferth, Shauman, West, & Henke, 1998). These numbers are bound to increase, given the increase in numbers of mothers in the workforce and given the emphasis on sending children to kindergarten "ready for school."

The Current Study

This paper aims to fill the gap in current information on the early childhood workforce and structural features of center-based early childhood programs by presenting the results of a nationally representative survey of teachers of 3- and 4-year-olds. This study was conducted by the National Center for Early Development and Learning to provide demographic information on early childhood programs and teachers and to assess teachers' practices, beliefs, and perceived barriers to endorsed practice. The current paper summarizes demographic information and compares it with estimates from other sources, including the 1990 study of child care settings conducted by the Mathematica Policy Group Inc. (Kisker, Hofferth, Phillips, & Farquhar, 1991). Teachers' practices, beliefs, and perceived barriers to practice are addressed in a separate paper (Early, Saluja, & Clifford, 2001). In this paper, we will present data on teacher characteristics as well as structural features of early childhood programs across the United States (enrollment, class size, hours of operation, and ratio of teachers to students). Because previous research has indicated links between early childhood program sponsorship (program type) and many features of early childhood programs, we focus on comparing centers across sponsorship categories (program types). Parents must choose among different program types when selecting a setting for their children. Policy makers need to understand the distinctions that exist between different types of early childhood settings as they adopt regulations and make funding decisions that affect parental choice of programs. Thus a better understanding of how program type is linked to structural features of quality is important.

Types of Programs Serving Young Children

Young children are being served in a variety of settings, including center-based programs, family child care, and care provided by relatives other than parents. The current study focuses on center-based care. These programs vary with regard to for-profit versus nonprofit status. Within profit status, they further vary with regard to organizational affiliation. For example, within the for-profit sector, settings can be independently operated or operated by a national or local chain. Within the nonprofit sector, settings can be affiliated with Head Start, a public school, a religious organization, or another type of nonprofit (e.g., YMCA). Both the setting's profit status and its organizational affiliation have implications for many aspects of the program's operations. Head Start, for instance, has specific guidelines governing class size, teacher education, and curriculum (U.S. Department of Health and Human Services, 1996). Likewise, according to several states' guidelines (e.g., Arkansas, Missouri, and North Carolina), religiously affiliated settings may operate within guidelines put forth by the sponsoring church or synagogue and are often exempt from state child care guidelines/regulations (National Resource Center for Health and Safety in Child Care, 2000).

A study by the Mathematica Policy Research group (Kisker, Hofferth, Phillips, & Farquhar, 1991) estimated that at the beginning of 1990, there were approximately 80,000

center-based programs in the United States. The authors differentiated program types by "sponsorship," defined as "a program's belonging to or having an affiliation with another organization from which the program receives direction and/or funding" (p. 33). The authors found that two-thirds of centers serving children 3 or older were nonprofit. Of those, about 23% were sponsored by a religious organization (such as a church or synagogue), 12% were sponsored by a public school, and 14% were sponsored by Head Start. An additional 51% of nonprofit centers were either independent or sponsored by another organization. Of the 36% for-profit centers, 17% were national or local chains and 83% were independent.

Structural Features of Quality

Despite the increasing number of children in care, we have little national information about the characteristics of early childhood teachers and the structural features of early childhood settings. We know what high-quality programs look like, and we have some evidence that the quality of care varies among different types of settings (Kisker, Hofferth, Phillips, & Farquhar, 1991); however, we lack a current profile of early childhood settings and the early childhood workforce. The current study aims to fill this gap by providing a current national profile of early childhood programs and teachers, including information on various aspects of quality.

Data from the Cost, Quality, and Outcomes study (Cost, Quality, and Outcomes Study Team, 1995) suggest that several structural characteristics of care settings are associated with quality in early childhood programs. These characteristics include the level of teacher education and specialized training, teacher wages, child-to-teacher ratios, teacher turnover, and administrator's prior experience.

Teacher Education

Generally speaking, higher-quality programs employ teachers who have completed more years of education than do lower-quality programs. Further, teachers in high-quality settings tend to have more specialized training in early childhood education and child development, and they are more informed about developmentally appropriate practices and teaching strategies for use with young children. Due to the short supply of teachers trained in early childhood education and the tight budgets of programs, it can be difficult to hire and keep teachers who are highly trained for their jobs (Whitebook, Howes, & Phillips, 1989).

According to data from the 1990 Profile of Child Care Settings (Kisker, Hofferth, Phillips, & Farquhar, 1991), 47% of teachers had a four-year college degree, 13% had an associate's degree, 26% had some college, 13% had graduated from high school, and 1% had less than a high school degree. Although these numbers may appear high in comparison to the general population, they are dramatically lower than the population of kindergarten teachers (Early, Pianta, & Cox, 1999). Teachers in nonprofit settings tend to be more highly educated than teachers in for-profit settings. Approximately 33% of teachers in for-profit settings had a college degree, whereas 50% of teachers in nonprofit settings had a college degree. Further, teachers in public-school-based settings were more educated than teachers in other settings. Eighty-eight percent had a college or graduate degree,

compared with 50% of teachers in religious settings and 45% of teachers in Head Start settings.

Wages and Turnover

Teacher education is highly correlated with teacher wages and turnover—two other important features of quality. As in other professions, teachers with more years of education tend to be paid more than teachers with fewer years of education. Furthermore, teachers who are paid more tend to stay at their jobs longer than those who are paid less (Whitebook, Howes, & Phillips, 1989).

Data from the Cost, Quality, and Outcomes study indicate that higher-quality settings have half as much turnover as lower-quality settings (Cost, Quality, and Outcomes Study Team, 1995). Research has demonstrated that children can be affected by the consistency of caregivers. Children with multiple caregivers in child care can form insecure attachments with their mothers and can have difficulty adjusting to school (Howes & Stewart, 1987, as cited in Kisker, Hofferth, Phillips, & Farquhar, 1991). Although teacher turnover seems to be a significant challenge in all types of programs, in 1990 for-profit centers had far higher teacher turnover than did nonprofit centers. Head Start and public-school-based programs were less likely to experience teacher turnover than any other program type (Kisker, Hofferth, Phillips, & Farquhar, 1991).

Child-to-Staff Ratio

Child-to-staff ratios are another important feature of quality. Generally speaking, higher-quality early childhood programs have more staff per child than lower-quality settings. Children in high-quality settings are likely to receive more individualized attention than children in centers where there are fewer teachers and more students. The National Association for the Education of Young Children (Bredekamp & Copple, 1997) recommends a ratio of 8 children per staff member for 3-year-olds and 10 children per staff member for 4-year-olds. Data from the 1990 Profile of Child Care Settings indicate that in 1990 the average was 9.9 children per staff member serving 3- to 5-year-olds (Kisker, Hofferth, Phillips, & Farquhar, 1991).

Other Important Features of Early Childhood Education

In addition to the indicators of quality discussed above, there are other important factors to examine when considering structural features of early childhood programs. These include the cultural representation of teachers of young children and the hours that these programs operate. As our population grows more diverse, it becomes increasingly important to have a diverse group of teachers. Ideally, the pool of teachers should reflect the cultural breakdown of the children. Horm-Wingerd and Hyson (2000) argue that a more diverse teaching pool encourages a more culturally sensitive environment for children. The field of early childhood education needs knowledgeable, trained, competent, and sensitive multilingual/multicultural early childhood educators. Further, early childhood educators who speak more than one language are an invaluable resource in the early childhood setting (NAEYC, 1995).

Little information is available with regard to hours of operation for early childhood programs, but this program feature is clearly of importance to parents. If programs aimed at providing enriching early educational experiences (e.g., Head Start, school-based public pre-kindergarten) only operate for a half-day or school day, parents who are employed full-time must find other care options for their children. The inflexible work schedules of working-class and low-income parents may prevent some children from attending programs that are designed specifically for them. This problem may be even more challenging for the 7.3% of women and 9.3% of men with children under 6 years of age who work second or third shifts (U.S. Department of Labor, 1997). Center-based care may be entirely unavailable for these families.

Method

Sample Selection and Procedures

We mailed questionnaires to a stratified random sample of 4,979 directors of early childhood centers nationwide in the fall of 1997. No national lists or registries of early childhood teachers exist, in part because of the high turnover in this field and the lack of a national- or state-level infrastructure. Therefore, we selected early childhood programs from a larger list of 85,715 programs purchased from a commercial firm. We believe that this list was the most comprehensive catalog of early childhood programs available at the time because the firm obtained child care licensing/accreditation records in every state and large urban area each time a new list became available. Further, they verified the existence/addresses of centers through mailings and follow-up phone calls. Each year, the firm adds from 4,000 to 5,000 programs to the list, and they drop approximately 3,000.

The sample was stratified on eight levels of program type (national or local chain, independent for-profit, religious affiliate, Head Start, public school, independent nonprofit, other public agency, and unknown) and four levels of program size (less than 40, 40-99, 100+, and unknown), creating 32 sampling cells. We over-sampled for chains and other public agencies at each level of center size because those were relatively small groups in the frame and we wanted to ensure a high enough response to draw meaningful conclusions. The sample included all types of part-day and full-day center-based care, including Head Start, public school based, church or synagogue based, and national and local chains. Family day care homes were excluded. (For a complete description of the sampling and weighting strategy, please contact the first author.)

Directors were asked to fill out the first page of the questionnaire, which asked general questions about the center (e.g., number of children served, program type). After completing this section, directors were asked to give the survey to the teacher of 3- or 4-year-olds who she/he felt was best qualified to answer the remainder of the questions. The survey included a definition of *teacher:* "We consider a teacher to be the person with primary responsibility for a group of children. There may be more than one teacher in a group (co-teachers), but teacher to us does not include assistant teachers, aides, floaters, or others who work under the direction of the primary teacher." Directors were specifically asked not to complete the teacher portion of the survey themselves, unless they were the only teachers of 3- and 4-year-olds in the center. Although this teacher-selection strategy was not the preferred strategy, pre-testing indicated that most directors, regardless of the

instructions given, used this strategy. Further, given that most programs follow local, state, or federal licensing requirements, we believe that there is little within-center variance among teachers with regard to qualifications. Teachers, rather than directors, were asked to return the questionnaires. In order to increase the likelihood that they did so, we stapled the envelope to the questionnaire.

The teacher section of the survey included questions about teachers' views of their roles as early childhood educators, their training experiences and barriers to additional training, the discipline strategies they employ, their classroom practices and beliefs about best practice, barriers to engaging in the practices they endorse, and demographic characteristics. Survey items were written primarily by the authors and were heavily pre-tested both through face-to-face interviews with local early childhood teachers and through two national samples who received and returned the survey by mail and later provided feedback by phone.

Response Rate

Our final sample included 1,902 teachers of 3- and 4-year-olds. Of the 4,979 mailed surveys, 4,782 went to valid addresses. A total of 2,031 were returned, for a return rate of 43%. Of the 2,031 that were returned, 1,971 were completed. The remaining 60 indicated that they had either closed or did not serve 3- or 4-year-olds. Finally, several were omitted because they were completed either by the center director who did not teach 3- or 4-year-olds ($n = 51$) or a teacher of children younger or older than 3 or 4 years of age ($n = 18$). This sorting left us with 40% of the surveys that went to valid addresses available for analyses. The current sample does contain 132 cases (7% after weighting) where a director completed the survey. All of these directors were also lead teachers of 3- or 4-year-olds, with primary responsibility for a group.

Data Analysis

Our primary goals in this study were to learn about what early childhood programs across the United States look like and to compare programs across the different program types. To this end, we will present national estimates of means and percentages, cross-tabulated by program types. Due to the large sample size, very small between-group differences are statistically significant. For this reason, we do not present tests of significance.

In order to obtain meaningful national estimates, two sets of weights were created: one to estimate center-level values and one to estimate teacher-level values. The center-level weights are based on the original sampling frame. The teacher-level weights are the product of multiplying the center-level weight by the number of teachers of 3- and 4-year-olds at the center. All analyses were conducted using SUDAAN, a software package specifically designed for complex sample surveys.

Results

Early Childhood Program Characteristics

Program Type. Directors were asked, "Which of the following best describes your center/school?" and were provided with a list of nine options. For data reduction purposes, we grouped these nine options into five classifications of program type: (1) public school (excluding Head Start), (2) Head Start, (3) independent nonprofit and other public agencies (e.g., operated by public college/university or public hospital), (4) affiliated with a church or synagogue, and (5) for-profit (includes independent for-profits, local for-profit chains, and national for-profit chains). Table 1 indicates the sample sizes and population estimates for each of these categories. Using these data, we estimate that 8% of centers are Head Start programs, 16% are in public schools, 25% are independent nonprofit or other public agency, 22% are affiliated with a religious organization, and 29% are for-profit.

Table 1
Program Type

	Sample Size	Population Estimate	SE	% of Population
Head Start	227	6,462	349	8
Public school (not Head Start)	313	12,017	300	16
Other public agency or independent nonprofit	585	19,179	803	25
Affiliated with a church or synagogue	317	17,194	558	22
For-profit	420	22,630	774	29
Missing	40			
TOTAL	1,902	**77,482**		

Hours of Operation. Center directors were asked to indicate the opening and closing times of their centers. We categorized their responses into four different groups: (1) half day (5 or fewer hours), (2) school-length day (5.1-8 hours), (3) full day (more than 8 hours), and (4) nontraditional hours (open any hours between 9:00 p.m. and 5:00 a.m.). These categories are mutually exclusive, and programs were categorized as "nontraditional hours" if they were open during the night, regardless of the number of hours they operated. Results indicate that the majority (58%) of early childhood programs are open for the full day, 30% are open for the school day, 12% are open half days, and 1% are open during nontraditional hours. This pattern held true across program types, with some variation. For example, as one would expect, public schools have the largest percentage of programs open during school days (see Table 2).

Table 2
Percentages (and Standard Errors) of Centers by Length of Day and by Program Type

	Overall	Public School	Head Start	Other Public Agency or Independent Nonprofit	Church/ Synagogue	For-profit
Half day (5 or fewer hours)	11.6 (0.8)	12.4 (1.9)	17.3 (2.6)	13.5 (1.9)	17.1 (2.2)	3.7 (1.1)
School day (5.1-8 hours)	30.0 (1.1)	73.0 (2.6)	46.7 (3.7)	19.5 (2.0)	35.1 (2.8)	7.8 (1.6)
Full day (more than 8 hours)	57.8 (1.1)	14.1 (2.1)	35.7 (3.7)	66.2 (2.4)	47.6 (2.8)	87.5 (2.0)
Nontraditional hours	0.7 (0.3)	0.5 (0.4)	0.4 (0.4)	0.8 (0.5)	0.3 (0.3)	1.0 (0.7)

Teacher Characteristics

Using these data, we estimated that there are 284,277 teachers of 3- and 4-year-olds in the United States.

Age and Gender. Teachers were asked to indicate their age and gender. We estimate that the average age of teachers of 3- and 4-year-olds is 39 years (SE = .34). For-profit centers have the youngest average age (M = 35, SE = .72), whereas public school teachers have the oldest average age (M = 42, SE = .67). Ninety-nine percent of teachers of 3- and 4-year-olds are female. Gender did not vary across program type.

Race/Ethnicity. Teachers were asked to indicate their race/ethnicity by checking all races/ethnicities that applied to them from a list of six options. By our estimates, the majority of teachers of 3- and 4-year-olds are White (78%), followed by Black or African American (10%) and Hispanic or Latino (6%). Only 1% of teachers are Asian or Pacific Islander, and less than 1% (.85%) are American Indian or Native Alaskan. A remaining 4% classified themselves as mixed/other. Table 3 displays the teacher racial/ethnic breakdown by program type. As is evident in this table, there is a smaller percentage of White teachers in Head Start programs than other program types. Additionally, public schools have a higher percentage of Hispanic or Latino teachers than any other program type.

Table 3
Teacher Race and Education Percentages (and Standard Errors) by Program Type*

	Overall	Public School	Head Start	Other Public Agency or Independent Nonprofit	Church/ Synagogue	For-profit
			Teacher Race			
American Indian or Native Alaskan	0.9% (.4)	0.6% (.5)	5.1% (3.2)	0.2% (.2)	0.6% (.5)	0% (0)
Asian or Pacific Islander	1.1% (.4)	0% (0)	2.7% (2.3)	0.5% (.2)	1.7% (.8)	0.9% (.4)
Black or African American	10.2% (1.2)	8.4% (2.3)	35.0% (6.5)	9.0% (1.5)	5.5% (1.2)	5.6% (1.5)
Hispanic or Latino	5.7% (1.0)	10.5% (5.0)	6.4% (2.5)	3.6% (.9)	2.9% (1.0)	7.5% (2.1)
White	78.4% (1.6)	78.2% (5.0)	47.5% (6.2)	80.5% (2.4)	85.7% (2.1)	83.3% (2.6)
Mixed/Other	3.8% (.6)	2.3% (1.1)	3.4% (1.4)	6.2% (1.8)	3.6% (1.1)	2.7% (1.0)
			Teacher Education			
High School graduation or below	8.6% (1.0)	.1% (.1)	6.0% (2.3)	7.4% (1.8)	7.7% (1.7)	14.5% (2.4)
Vocational training or some college	26.8% (1.6)	4.0% (1.3)	33.2% (6.2)	20.4% (2.4)	28.6% (3.5)	36.0% (3.3)
Associates	14.7% (1.7)	8.9% (2.7)	17.7% (2.3)	17.7% (2.3)	17.9% (2.8)	10.8% (2.0)
Bachelor's or higher	49.9% (1.8)	87.0% (2.9)	40.4% (6.1)	54.5% (3.0)	45.8% (3.6)	38.6% (3.5)

*All values are weighted to represent the United States as a whole (overall column) or the specified program type. Values in parentheses represent standard errors.

Education. Teachers were asked, "How far did you go in school?" and were given eight options, from "8th grade or less" to "advanced degree (master's, doctorate)." As seen in Table 3, we grouped their responses into four categories. Ninety-one percent of teachers of 3- and 4-year-olds have some education beyond high school. Of this number, 27% have some college and an additional 50% have at least a bachelor's degree. Only 0.1% stated that they did not have a high school diploma or GED equivalency. Teacher education varies by program type. Teachers in public schools had more education than teachers in

other program types. Eighty-seven percent of teachers who work in the public schools have at least a bachelor's degree, whereas less than 50% of teachers in religious settings, for-profit settings, and Head Start programs have a bachelor's (see Table 3).

We also asked teachers to report what types of training they had received in early childhood education or child development. We asked teachers to check all that applied from the following list: (1) no specialized training, (2) workshops, (3) some college courses but no degree, (4) CDA (Child Development Associate), (5) AA (associate's degree), (6) working on bachelor's, (7) BA/BS (bachelor's), and (8) advanced degree. Less than 1% of early childhood teachers reported no training in early childhood. Many (62%) have at least attended workshops on early childhood topics. Thirty-one percent have taken some college-level courses in early childhood but have not earned a college degree in early childhood, 19% have earned a CDA, 12% have an associate's degree, 31% have earned a bachelor's degree, and 13% have an advanced degree in early childhood.

Tenure. We asked teachers to indicate how long they had been employed at their current jobs. Using these data, we estimate that on average, teachers have been at their jobs 82 months (6.8 years). Teachers who teach in the public schools or at a church or synagogue have been at their jobs the longest (M = 93 months, or 7.8 years). Head Start teachers have been at their jobs for an average of 83 months (6.9 years), and teachers at public agencies or independent nonprofit agencies have been at their jobs 85 months (7.1 years). Teachers at for-profit centers have spent the least time at their current jobs, averaging 67 months (5.6 years).

Hours Worked per Week. Teachers were asked, "How many hours do you usually work at this center/school each week?" Our data indicate that teachers report working an average of 35 hours per week. The majority (75.8%) of teachers reported working between 20-40 hours per week, although 16% work fewer than 20 hours per week, and 9% work more than 40 hours per week. It is unclear, however, if this number reflects the number of hours for which they are paid for their time.

The above pattern held true, to varying degrees, across program types. More teachers in public schools reported working more than 40 hours per week (16.3%) than in any other program type. Some teachers in other program types also reported that they worked more than 40 hours a week, but those percentages were not as high. Three percent of teachers in church/synagogue programs reported working more than 40 hours per week, whereas 12% of teachers in nonprofit centers reported working more than 40 hours per week. Teachers at church/synagogue settings most often reported working fewer than 20 hours per week (24%). Nine percent of teachers at for-profit centers reported working fewer than 20 hours per week, whereas only 3% of Head Start teachers reported working less than half time.

Classroom Characteristics

Child Race/Ethnicity. Teachers were given racial/ethnic categories and asked to indicate the number of children in their class in each category. Although classes vary with regard to racial diversity of children, our data suggest that the average early childhood classroom is 66% White, 15% African American, 9% Hispanic, 5% mixed race, 4% Asian American, 1% Native American, and 1% other. Public school and Head Start programs are more ethnically diverse than other programs. Table 4 displays the racial breakdown for all

program types.

Table 4
Mean Percentages (and Standard Errors) of Students in Each Racial Group by Program Type*

	Overall	Public School	Head Start	Other Public Agency or Independent Nonprofit	Church/ Synagogue	For-profit
American Indian or Native Alaskan	1.2% (.2)	1.6% (.6)	2.2% (.6)	0.7% (.2)	0.9% (.4)	1.1% (.3)
Black or African American	15.1% (.8)	19.9% (2.0)	36.5% (4.1)	16.0% (1.7)	6.8% (.9)	11.1% (1.1)
Asian or Pacific Islander	3.5% (.3)	3.3% (.7)	.8% (.3)	4.3% (.7)	4.5% (.7)	3.0% (.5)
White	65.8% (1.1)	51.8% (3.3)	40.1% (4.7)	64.8% (2.1)	77.8% (1.8)	72.5% (.7)
Hispanic or Latino	8.7% (.7)	19.0% (3.2)	15.8% (3.9)	6.6% (.8)	5.5% (.8)	6.3% (.9)
Mixed Race/ Ethnicity	5.0% (.7)	3.7% (.7)	4.8% (.9)	6.3% (.6)	4.0% (.5)	5.3% (.7)
Other	0.8% (.1)	0.6% (.2)	0.1% (.1)	1.4% (.4)	0.8% (.2)	0.7% (.2)

*All values are weighted to represent the United States as a whole (overall column) or the specified program type. Values in parentheses represent standard errors.

The numbers in Table 4 represent what the average classroom looks like. In reality, because there is wide variation with regard to racial diversity, very few classrooms will resemble the "average" classroom. For this reason, we calculated the percentage of classrooms in which one racial/ethnic group is prevalent. If a classroom had 75% or more of one racial/ethnic group, we considered that group prevalent in that classroom.

Our results indicate that most classrooms (61.3%) in the United States have a racial/ethnic group that predominates and that group is White about half the time (see Table 5). However, a large minority of classrooms (38.7%) have no racial/ethnic group that predominates. Head Start programs are more likely than any other program to be predominantly African American. Church/synagogue-based programs are especially likely to be predominantly White (67%).

Table 5
Percentages (and Standard Errors) of Classrooms with 75% or More of One Racial Group, by Program Type*

	Overall	Public School	Head Start	Other Public Agency or Independent Nonprofit	Church/ Synagogue	For-profit
African American	6.4% (.8)	9.4% (2.0)	22.2% (4.9)	5.9% (1.4)	3.0% (.8)	1.9% (.7)
Native American	.3% (.1)	5% (.5)	.7% (.4)	.1% (.1)	.4 (.3)	.2% (.2)
Asian	.3% (.1)	.5% (.5)	0% (0)	.7% (.5)	.4 (.3)	.1% (.1)
Hispanic	2.8% (.7)	8.6% (2.5)	8.6% (4.8)	1.1% (.5)	1.1% (.7)	1.1% (.7)
White	51.4% (1.8)	36.7% (4.5)	21.7% (5.4)	53.1% (3.1)	67.2% (3.4)	55.2% (3.5)
None over 75%	38.7% (1.7)	44.4% (4.8)	46.7% (6.2)	39.0% (3.0)	27.9% (3.3)	41.6% (3.5)

*All values are weighted to represent the United States as a whole (overall column) or the specified program type. Values in parentheses represent standard errors.

Teachers. Who are the teachers who are teaching children of diverse backgrounds? As stated previously, most early childhood teachers are White; however, many classrooms that contain a large number of non-White children have teachers from the same racial/ethnic groups that predominate in the classroom. To explore this issue, we looked at classrooms that contain 75% or more children of one race, and then looked at the teachers in these classrooms. As seen on the diagonal centerline of Table 6, classrooms in which 75% or more of the children are from one racial/ethnic group have a larger percentage of teachers of that same race than teachers of another race.

Table 6
Percentages (and Standard Errors) of Teachers in Each Racial/Ethnic Category by Predominant Race/Ethnicity of Children in the Classrooms

	Classroom Race					
Teacher Race	75% African American	75% Asian	75% Hispanic	75% Native American	75% White	No Race 75% or Over
African American	70.5% (5.1)	0% (0)	23.8% (16.0)	0% (0)	1.4% (.5)	11.1% (1.9)
Asian	.8% (.5)	6.6% (6.7)	0% (0)	0% (0)	.3% (.1)	2.1% (.9)
Hispanic	0% (0)	6.8% (6.9)	46.4% (12.4)	0% (0)	.7% (.3)	10.4% (2.2)
Native American	.3% (.3)	0% (0)	0% (0)	31.9% (18.0)	0% (0)	1.9% (1.0)
White	22.3% (4.6)	70.2% (16.7)	25.8% (8.4)	41.5% (19.2)	95.3% (.9)	69.9% (2.9)
Mixed Other	6.2% (2.6)	16.2% (14.8)	4.0% (2.7)	26.6% (14.7)	2.3% (.6)	4.7% (1.2)

*All values are weighted to represent the United States as a whole (overall column) or the specified program type. Values in parentheses represent standard errors.

Class Size and Ratios. Teachers were asked to indicate the number of children and paid staff members in their group at one time. Based on these data, we computed child-to-staff ratios. As seen in Table 7, the average classroom has 16.4 children, with 2.0 paid staff. The average child-to-staff ratio is 9 to 1. Programs in religious settings have the smallest class size, whereas Head Start programs have the largest class size. Public school programs have the most favorable child-to-staff ratios, whereas for-profit programs have the least favorable ratios (see Table 7).

Table 7
Mean Group Size and Staff: Child Ratios (and Standard Errors) by Program Type*

	Overall	Public School	Head Start	Other Public Agency or Independent Nonprofit	Church/ Synagogue	For-profit
Children in group	16.4 (.2)	16.9 (.5)	18.2 (.4)	17.1 (.4)	15.0 (.4)	16 (.4)
Paid staff in group	2.0 (0)	2.4 (.1)	2.2 (.1)	2.2 (.1)	1.7 (.1)	1.7 (.1)
Staff-to-child ratio	1:9 (.1)	1:8.1 (.4)	1:8.5 (.3)	1:8.9 (.2)	1:9.7 (.3)	1:10.2 (.3)

*All values are weighted to represent the United States as a whole (overall column) or the specified program type. Values in parentheses represent standard errors.

Discussion

The purpose of this paper was to present information on early childhood programs for 3- and 4-year-olds and teachers of young children across the United States. Our data indicate that for-profit centers outnumber other types of centers, although there are many religiously affiliated programs, Head Start programs, public school programs, and other nonprofit programs. Most programs operate more than eight hours a day, and almost none operate during night hours. Structural features of early education programs vary with regard to program type. We found that the vast majority of teachers of 3- and 4-year-olds are White women. Teachers are diverse with regard to educational background, with about half holding a college degree.

Currently, we are lacking an ongoing, systematic method of collecting information on early childhood programs. Further, the information available varies with regard to sampling strategy, making direct comparisons and considerations of changes over time difficult. In the present study, we selected our sample through a random selection of center names from a list we acquired from a private marketing firm. In an earlier study, Kisker, Hofferth, Phillips, and Farquhar (1991) identified their sample of centers by first selecting a random sample of counties in the United States. These counties were stratified according to region, metropolitan status, and poverty level. Once counties were selected, they randomly selected child care providers within each of the counties and collected information on all staff within their center. Therefore, the information they collected on teachers will not reflect the sampling error that our data reflect.

The Cost, Quality, and Outcomes Study Team (1995) selected their centers by first selecting regions within four states from which to collect data. Within each of these states, the study team selected a stratified random sample of 100 programs with equal representation of for-profit and nonprofit centers. Once centers were identified, classrooms were randomly chosen within each center. Only programs that provided services 30 hours per week and 11 months per year were included; therefore, no public school or Head Start programs were included in their sample.

In the following section, we will draw comparisons between our data and the data collected by Kisker, Hofferth, Phillips, and Farquhar (1991) and the Cost, Quality, and Outcomes Study Team (1995). Despite the differences in sampling among those studies and the present study, all three of these studies are large-scale studies that provide a national picture of what is happening in early education programs. However, the differences in sampling strategies should be kept in mind when comparisons are made.

Data collected in the present study suggest that the number of early childhood programs in public schools has grown in the past 10 years. Although the sampling strategy for the Cost, Quality, and Outcomes Study Team (1995) does not allow for this type of calculation, Kisker, Hofferth, Phillips, and Farquhar (1991) reported that in 1990, 8% of centers were located in public schools. According to our estimates, this number has since doubled. This estimate is consistent with the findings of other researchers that indicate that public schools are playing an increasingly large role in the provision of care and education of children prior to kindergarten entry in the United States (Clifford, Early, & Hills, 1999; Mitchell, Ripple, & Chanana, 1998). Currently, over 40 state departments of education are funding programs for 3- and/or 4-year-olds (Schulman, Blank, & Ewen, 1999), and many of these programs are in public schools. Clifford and colleagues found that at least one in seven 4-year-olds was attending an early childhood program in a public school in 1995. Some states, such as Georgia and New York, are moving toward making pre-kindergarten available for all 4-year-olds in their state. Other states, such as Ohio and Minnesota, are using state dollars to expand Head Start programs in order to provide services to more children. Given the trend in the past few years, the number of young children in schools before kindergarten is likely to increase. Clearly, the role of public schools in providing programming prior to kindergarten merits further study.

Quality Practices

Although the Profile of Child Care Settings study (Kisker, Hofferth, Phillips, & Farquhar, 1991) was conducted 10 years ago, there are many similarities between those data and the data we collected in the present study. For example, with regard to education, teachers in public schools are still more educated than teachers in other settings, especially those in for-profit settings. Overall, as reported by Kisker, Hofferth, Phillips, and Farquhar (1991), 50% of teachers of 3- and 4-year-olds still do not hold a college degree. The Cost, Quality, and Outcomes Study Team (1995) reported that only 31% of teachers had a college degree. However, their sample mostly excluded public school teachers, the group found to have the highest education in our sample. If public school teachers were excluded from our sample, teacher educational attainment would look much more similar to the Cost, Quality, and Outcomes study findings. Given all the evidence that links higher teacher education to higher-quality services for children (e.g., Cost, Quality, and Outcomes Study Team, 1995; Whitebook, Howes, & Phillips, 1989), these data are somewhat discouraging. However, more recent research (Saluja, Early, & Clifford, 2000) suggests that many states are making efforts to reform their policies regarding teacher education requirements with the hope that they will soon have a more highly educated early childhood workforce.

Another somewhat discouraging finding is that the child care workforce is still predominantly White and is not well matched with the ethnic/racial diversity seen among children. In fact, the percentage of teachers from minority backgrounds has decreased

since 1990, according to these data. In 1991, Kisker, Hofferth, Phillips, and Farquhar reported that the racial and ethnic backgrounds of teachers in early education and care programs in 1990 were as follows: 74% White, 5% Hispanic, 18% Black, and 3% Other. We estimated that 78% of teachers in center-based care are White, whereas only 10% are Black, 6% are Latino, and 6% are of another race (or mixed race). Ideally, the early childhood workforce should reflect the cultural composition of those children enrolled in early childhood programs. Many believe that seeing teachers from a similar ethnic background validates children's identities. Further, seeing teachers from different backgrounds may help break down stereotypes (Chang, Muckelroy, & Pulido-Tobiassen, 1996). Efforts to recruit more ethnic minorities into the field of early childhood education need to be made.

Our data indicate that, on average, centers tend to have staff-to-child ratios comparable to NAEYC's recommendation, except for-profit centers. Given that this is probably a "best case" picture, the fact that for-profit centers report ratios of more than 1 to 10 seems problematic. Kisker, Hofferth, Phillips, and Farquhar (1991) also found that for-profit chain centers had less-favorable ratios than independent for-profit, religiously affiliated, and other nonprofit centers. This variation in ratios among different types of centers is probably due in part to variation in state child care licensing regulations. According to data compiled in 1998 (Mitchell, Ripple, & Chanana, 1998), 16 states allowed for ratios between 1 to 15 and 1 to 20. Until states adopt stricter regulations, centers will continue to maintain high ratios in order to maximize revenues.

The majority of early childhood programs operate during the day. Less than 1% of the programs operate at night, making it difficult for parents who work second or third shifts to find center-based care for their children. As more programs open in the schools, more programs will follow school hours, making it increasingly difficult for this population to find care for their children. These parents are forced to select other types of care. Careful consideration needs to be given to this issue so as to avoid overlooking this important part of our population.

Limitations of Study

Based on the average age of our sample, the education level, and the relatively low turnover rate, we suspect that our sample may not be wholly representative of the national early childhood workforce. We suspect that this conclusion is due to our sampling method and our lower-than-anticipated response rate. We believe that directors asked their more experienced teachers to complete the teacher section of the questionnaire. Therefore, the average age, educational attainment, and tenure of teachers reflected in this study are likely to be inflated. However, if most directors chose their best teacher, comparisons among different program types are probably accurate. Nonetheless, these data should be interpreted with caution.

Conclusion

As more and more parents of young children enter the workforce, they face the sometimes difficult task of choosing who will care for their children. As they make these decisions, it is important that they have access to information such as that described in this paper. Further, in order to make improvements to the early childhood education system, we need

to have access to information on the current status of the programs available to young children. More research is needed; ongoing tracking of early childhood programs and the workforce would aid policy makers as decisions are made about regulation and funding.

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Three Approaches from Europe: Waldorf, Montessori, and Reggio Emilia

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Abstract

Waldorf, Montessori, and Reggio Emilia are three progressive approaches to early childhood education that appear to be growing in influence in North America and to have many points in common. This article provides a brief comparative introduction and highlights several key areas of similarity and contrast. All three approaches represent an explicit idealism and turn away from war and violence toward peace and reconstruction. They are built on coherent visions of how to improve human society by helping children realize their full potential as intelligent, creative, whole persons. In each approach, children are viewed as active authors of their own development, strongly influenced by natural, dynamic, self-righting forces within themselves, opening the way toward growth and learning. Teachers depend for their work with children on carefully prepared, aesthetically pleasing environments that serve as a pedagogical tool and provide strong messages about the curriculum and about respect for children. Partnering with parents is highly valued in all three approaches, and children are evaluated by means other than traditional tests and grades. However, there are also many areas of difference, some at the level of principle and others at the level of strategy. Underlying the three approaches are variant views of the nature of young children's needs, interests, and modes of learning that lead to contrasts in the ways that teachers interact with children in the classroom, frame and structure learning experiences for children, and follow the children through observation/documentation. The article ends with discussion of the methods that researchers apply to analyze the strengths and weaknesses of each approach.

Introduction

Europe has been a rich source of many influential educational ideas. In elementary and early childhood education, three of the best-known approaches with European origins are Waldorf, Montessori, and Reggio Emilia. All three are seen as strong educational alternatives to traditional education and as sources of inspiration for progressive educational reform. Contemporary interest in these approaches leads the public and the professional community to ask many questions about their parallels and contrasts. Many observers have noticed common themes and elements in their views of children and their development. What exactly are their respective historical origins and foundational

philosophical premises and concepts about child development and learning? How do they compare with respect to organizational structures for decision making and school environments, curriculum, instructional methods, observation/assessment, and teacher preparation—the elements of curriculum models (Goffin, 2000)?

This article provides an overview and comparison of the three approaches, to introduce them to readers and highlight key points of similarity and difference. Of course, in actuality, great variation can be expected to exist in how any educational model or approach plays out in application. Schools and classrooms do not necessarily look alike just because they derive from the same philosophy, and this article can at most describe only the general tendencies that may not correctly describe particular schools or programs. To understand a specific institution, one must observe its environments and teacher-child interactions, read its documents, interview staff, and talk to past and present parents and children. Because this article addresses the general level, it speaks primarily to underlying goals and principles—"best practice" from three points of view—and provides resources pointing the reader toward additional information.

History

All three approaches represent an explicit idealism and turn away from violence, toward peace and reconstruction. They are built on coherent visions of how to improve human society by helping children realize their full potential as intelligent, creative, whole persons. School communities struggle continually to keep their guiding principles alive in current, meaningful ways and not to let them degrade into slogans.

Waldorf education was founded by Rudolf Steiner (1861-1925), a maverick Austrian scientist and philosophical thinker. His interests intersected spiritual and scientific planes: he wanted to integrate these two forms of understanding and experience, and he founded "Anthroposophy" ("knowledge of the true nature of the human being" [Kotzsch, 1990]). In 1919, in the wake of the devastation of World War I, Steiner was invited by Emil Mott to found a school for the employees of the Waldorf-Astoria cigarette factory in Stuttgart, Germany. The vision was that this new kind of school would educate human beings able to create a just and peaceful society. It defied the conventions of the time in being coeducational (bringing boys and girls together in the classroom), open to children of any background (without entrance examination), comprehensive (from preschool level through high school), and independent of external control (a self-governing administrative unit). Today, Waldorf education continues to be a well-defined model with every school administratively independent (Barnes, 1991; Oppenheimer, 1999). There are now more than 800 Waldorf schools in over 40 countries, with 140 schools affiliated with the Association of Waldorf Schools of North America (AWSNA). Bob Lathe and Nancy Parsons (http://www.bobnancy.com/) maintain a list of Waldorf schools affiliated with AWSNA, and about 40 charter schools, parent-initiative schools, and other schools not affiliated but philosophically close to AWSNA. The Web sites http://www.awsna.org and http://www.waldorflibrary.org contain information about philosophy, publication resources, and alumni. There are 10 Steiner teacher-training institutes in the United States and 2 in Canada (see http://www.bobnancy.com/).

Maria Montessori (1870-1952) was the brilliant figure who was Italy's first woman physician. After innovating a methodology for working with children with disabilities, she

started her Casa dei Bambini (Children's House) in 1907 for children ages 4 through 7 in a housing project in the slums of Rome. Her movement spread to other countries, especially after the Fascist regime denounced Montessori methods of education and she left Italy. In the United States, there was strong but brief interest from 1910 to 1920, but then Montessori education fell out of favor (Torrence & Chattin-McNichols, 2000). During this time, however, the movement flourished in Europe and India. In the 1950s, American educator Nancy Rambush led a movement of renewal, and Montessori education spread as an independent school movement (Loeffler, 1992). There are probably 5,000 or more schools calling themselves "Montessori" in the United States (Ruenzel, 1997). Of these, about 20% are affiliated with the two major accrediting organizations. Association Montessori Internationale (AMI) (http://www.montessori-ami.org/ami.htm) promotes the study, application, and propagation of Montessori's (original) ideas and principles for education and human development. The American Montessori Society (AMS) (http://www.amshq.org) supports Montessori education in the context of contemporary American culture (Loeffler, 1992). The Web sites provide information about program history, philosophy, accreditation, teacher training, and published resources. The AMI Web site provides a map that gives a good picture of the Montessori movement worldwide. The AMS Web site provides information about their teacher research network and a set of position papers on such topics as learning and assessment, inclusion, infant programs, math and music education, multiage grouping, and holistic peace education. There are many Montessori teacher-training programs, over 50 of which are affiliated with AMS and 15 with AMI (see the Web site of the North American Montessori Teachers' Association at http://www.montessori-namta.org). In the 1960s, furthermore, American parents began to advocate for Montessori education in public schools, leading to hundreds of Montessori programs (often magnet programs) at the preschool and elementary levels, and now increasingly at the middle and high school levels (Chattin-McNichols, 1992b). All of the major Montessori organizations in the United States have endorsed a position paper on "Essential Elements of Successful Public Montessori Schools" (http://www.amshq.org/schls/publicintro.html). Montessori education at the infant-toddler level is also growing rapidly.

Reggio Emilia is a city in northern Italy where educators, parents, and children began working together after World War II to reconstruct society and build an exemplary system of municipal preschools and infant-toddler centers (New, 1993). Under leadership of the visionary founding director, Loris Malaguzzi (1920-1994), the system evolved from a parent cooperative movement into a city-run system that exercises a leadership role in Italy and throughout Europe, and now increasingly in Asia, Australia, North America, and other parts of the world (New, 2000). The Reggio Institute in Stockholm, Sweden, is known as a source of innovation and reflection (Dahlberg, Moss, & Pence, 1999). Programs in Reggio are family centered and serve children at infant-toddler and preschool levels (Edwards, Gandini, & Forman, 1998; Gandini & Edwards, 2001), with first priority given to children with disabilities or social service needs. Reggio Emilia is not a formal model like Waldorf and Montessori, with defined methods, teacher certification standards, and accreditation processes. Instead, educators in Reggio Emilia speak of their evolving "experience" and see themselves as a provocation and reference point, a way of engaging in dialogue starting from a strong and rich vision of the child (Edwards, Gandini, & Forman, 1998; Katz & Cesarone, 1994; New, 2000). Reggio Children/USA is the North American arm of Reggio Children S.r.l., the Italian organization set up in 1994 to protect and enrich the educational theory and practice accumulated in the Reggio Emilia municipal infant/toddler and preschool centers. The ERIC/EECE Web site has an extensive Reggio link

(http://ericeece.org/reggio.html), presenting information about Reggio Children/USA and a list of self-nominated schools in North America with programs based on or inspired by the approach used in Reggio Emilia. The Merrill-Palmer Institute of Wayne State University maintains the Web site of Reggio Resources, publishes the periodical *Innovations in Early Education: The International Reggio Exchange*, and updates study tour, conference, and contact information (http://www.mpi.wayne.edu/).

Child Development Theory and Curriculum

All three approaches view children as active authors of their own development, strongly influenced by natural, dynamic, self-righting forces within themselves, opening the way toward growth and learning.

Rudolf Steiner believed in a unity of spirit, soul, and body, and that good education restores the balance between thinking, willing, and feeling (Steiner, 1995). His theory of child development elaborated three cycles of seven-year stages, each with its own distinctive needs for learning—an ascending spiral of knowledge. Before age 7, nursery and kindergarten children learn through *imitation* and doing (Schwartz, 1996). Imaginary play is considered the most important "work" of the young child and the activity through which the child grows physically, intellectually, and emotionally. The educational focus is on bodily exploration, constructive and creative play, and oral (never written) language, story, and song. On a given morning, children might do such things as sing songs, paint with watercolors, color with beeswax crayons, cook, hear a story told with puppets, go on a nature walk, work in the garden, build with wooden blocks, or make houses using play stands and cloth. Through these activities, they become deeply engaged and develop powers of concentration and motivation. A significant portion of the school morning is devoted to uninterrupted imaginary play. Recognition of the importance of "rhythm" and of balance of energetic and restful play leads teachers to follow a cyclical schedule of yearly, weekly, and daily activities, including festivals and foods. From 7 to 14 years, children stay with the same teacher and classroom group, and they become a very close-knit group as they explore the world through conscious *imagination* or "feeling intelligence" (Finser, 1995). The teacher presents a curriculum that has structure and sequence but that relies on lessons unaccompanied by textbooks. This approach fosters an integrated, multisensorial approach to learning and expression, with more emphasis on oral listening and memory than is found in other early childhood models for the primary years. For example, the teacher might introduce an arithmetical operation by telling a story where the numbers are characters in a drama or render the history of the Norman Conquest as an exciting tale. Children listen as the teacher presents the material, and they integrate what they have learned as they design and illustrate with care and beauty their own lesson books. In essence, they compose their own texts, which preserve for them what they have learned in their own personal format, documents and treasures of their learning experiences. Children study literature, folktales, and mythology; rhythmic musical movement (eurythmy); practical crafts; natural sciences; foreign languages; art; and music. Out of doors, they may construct play shelters with boards, branches, and other materials. During the high school years, the rational, abstract power of the *intellect* emerges, and adolescents focus on ethics, social responsibility, and mastery of complex and rigorous subject matter, with specialized teachers. Images of Waldorf education grades K-12 in four different schools can be found in the video "Waldorf Education: A Vision of Wholeness" (Hagens Recording Studio, 1996).

Maria Montessori's approach reflects a theoretical kinship with the European progressive educational philosophers Rousseau, Pestalozzi, Seguin, and Itard. She believed in children's natural intelligence, involving from the start rational, empirical, and spiritual aspects. She saw development as a series of six-year periods, like repeating triangular waves, each with its own particular sensitivities. A *constructivist,* she posited an active child, eager for knowledge and prepared to learn, seeking perfection through reality, play, and work. In Montessori education, children usually are grouped into multiage classrooms spanning three years, in order to promote adult-child continuity and close peer relationships. Birth to age 3 is the time of the "unconscious absorbent mind," whereas age 3 to 6 is the time of the "conscious absorbent mind" (Montessori & Chattin-McNichols, 1995). In both, the child seeks sensory input, regulation of movement, order, and freedom to choose activities and explore them deeply without interruption in a carefully prepared (serene and beautiful) environment that helps the child choose well (Greenwald, 1999). During the infant-toddler (birth to age 3) and primary (age 3 to 6) years, classrooms usually have more than one teacher. To introduce new curriculum, teachers present demonstration lessons at the point when an individual or small group indicates readiness to advance in the sequence of self-correcting materials, in the areas of practical life, sensorial, mathematics, language, science and geography, and art and music (Humphryes, 1998). Montessori designed famous materials still in use; photos of some of these can be found at http://www.montessori-ami.org/ami.htm. In addition, other classroom materials are created or put together by individual teachers or groups as they carefully consider their classroom observations. The Montessori curriculum is highly individualized but with scope and sequence and clearcut domains. The individualization results in some young children mastering reading and writing before age 6 following Montessori "writing to read" methods. Preschool children in full-day programs usually address the Montessori curriculum in the morning and typical child-care play including fantasy play in the afternoon. From age 6 to 12, children are expected to explore a wider world and develop rational problem solving, cooperative social relations, imagination and aesthetics, and complex cultural knowledge. From 12 to 18, children reconstruct themselves as social beings and are humanistic explorers, real-world problem solvers, and rational seekers of justice.

Loris Malaguzzi's thinking reflects a social constructivism drawing from Dewey, Piaget, Vygotsky, Bruner, and others. Focusing on the infant and preschool years only, Malaguzzi rejected Piaget's stage notions as too limiting. He drew a powerful image of the child, social from birth, full of intelligence, curiosity, and wonder. His vision of an "education based on relationships" focuses on each child in relation to others and seeks to activate and support children's reciprocal relationships with other children, family, teachers, society, and the environment (Malaguzzi, 1993). This resourceful child generates changes in the systems in which he or she is involved and becomes a "producer of culture, values, and rights" (Rinaldi, 2001a, p. 51). Teachers seek to hold before them this powerful image as they support children in exploring and investigating. Children grow in competence to symbolically represent ideas and feelings through any of their "hundreds of languages" (expressive, communicative, and cognitive)—words, movement, drawing, painting, building, sculpture, shadow play, collage, dramatic play, music, to name a few—that they systemically explore and combine. Teachers follow the children's interests and do not provide focused instruction in reading and writing; however, they foster emergent literacy as children record and manipulate their ideas and communicate with others. The curriculum has purposive progression but not scope and sequence. Teaching and learning

are negotiated, emergent processes between adults and children, involving generous time and in-depth revisiting and reviewing. Close, multiyear adult-child and peer relations are fostered, usually through a looping organization. Long-term, open-ended projects are important vehicles for collaborative work, in classroom environments carefully prepared to offer complexity, beauty, and a sense of well-being and ease. The Reggio Emilia approach was developed within and for the municipal child care and education programs serving children under 6 and therefore is not an elementary school approach. However, progressive educators in the United States have taken useful insights from Reggio Emilia into primary education (especially with respect to project work and observation/documentation). Visual images of the preschool environments in Reggio Emilia are presented in Patricia Tarr's (2001) online article (http://www.designshare.com/Research/Tarr/Aesthetic_Codes_1.htm) and in the slide set *Open Window* (Reggio Children S.r.l., n.d.). Images of environments and learning experiences at L'Atelier, a preschool in Miami, Florida, consulting with Reggio Emilia educators, can be found at http://www.latelier.org (link to Pictures).

Roles of the Teacher

The teachers in these approaches share in common the goals to be nurturers, partners, and guides to children. They depend on carefully prepared, aesthetically pleasing environments as a pedagogical tool, providing strong messages about the curriculum and respect for children. Partnering with parents is highly valued in all three approaches. However, their contrasting views of the nature of children and of learning lead them to act out differing roles in the classroom. Coulter (1991) presents an interesting argument that Montessori and Waldorf education are like "reverse symmetries," born out of their founders' responsive solutions to historical contexts presenting differing issues to children. Of course, in all three approaches, teacher roles with children change with age; adults are more nurturing with younger children.

The Waldorf teacher generally plays a *performance role* in the classroom as he or she leads or models many whole-group activities involving integration of the academic and the artistic with an explicit spirituality. The teacher is also a didactic moral leader, seeking to provide an intimate classroom atmosphere permeated with a sense of *harmony* and full of themes about caring for the community and for the natural and living worlds. The teacher needs a classroom in which children can bring together their thinking, feeling, and willing, no matter what their personalities and temperaments (Durach, 1998). Color and the use of natural materials and carefully chosen props (such as open-ended, handmade toys and dolls with minimal detail to encourage the imagination) are intrinsic to the uncluttered, warm and homelike, aesthetically pleasing Waldorf environments (Schwartz, 1996). Examples of Waldorf materials can be seen at the Web site http://www.NaturalPlay.com/index.shtml. Teachers seek to encourage the child's natural sense of wonder, belief in goodness, and love of beauty. They are more reticent at the early childhood levels of Waldorf and more directive and didactic in the elementary and secondary classrooms. In the kindergarten classroom, teachers seek to be subtle in their guidance, yet always aware of everything going on in the room (Schwartz, 1996).

The Montessori teacher plays the role of *unobtrusive* director in the classroom as children individually or in small groups engage in self-directed activity. Based on detailed, systematic observation of the children, the teacher seeks to provide an atmosphere of

productive calm as children smoothly move along in their learning, alternating between long periods of intense concentration interspersed with brief moments of recovery/reorganization (Oppenheimer, 1999). The teacher's goal is to help and encourage the children, allowing them to develop confidence and inner discipline so that there is less and less need to intervene as the child develops. Interrupting children when engaged in purposeful activity interferes with their momentum, interest, and inner workings of thought (Greenwald, 1999). During the early childhood years, the teacher brings the young child into close contact with reality through sensory investigation and practical activity and then relies on the child's unfolding inner program of curiosities and sensitivities to ensure that the child will learn what he or she needs. With the younger students at each level, the teacher is more active, demonstrating the use of materials and presenting activities based on an assessment of the child's requirements. Montessori classrooms provide carefully prepared, orderly, pleasing environments and materials where children are free to respond to their natural tendency to work individually or in small groups (see http://www.montessori-namta.org or the videotapes and slide sets for parent education from the North American Montessori Teachers' Association). Books, toys, and materials are carefully chosen to favor refined quality and natural materials. Books present images of the real world in a beautiful way, waiting to introduce fantasy until age 5 or 6 (consult catalogs at http://www.michaelolaf.net). The children progress at their own pace and rhythm, according to their individual capabilities. The school community as a whole, including the parents, work together to open the children to the integration of body, mind, emotions, and spirit that is the basis of holistic peace education (accepting and relating harmoniously with all human beings and the natural environment).

The Reggio teacher plays a role of *artful balancing* between engagement and attention (Edwards, 1998). Based on careful and sensitive listening, observation/documentation, and reflection with other adults, the teachers serve as resources and guides to the children (Rinaldi, 2001b). Classroom teachers work in pairs, and collaboration and mentoring between personnel throughout the system are strongly promoted. Additional teachers especially trained in the visual arts work with teachers and children to encourage expression through different media and symbol systems. Teachers organize environments rich in possibilities and provocations that invite the children to undertake extended exploration and problem solving, often in small groups, where cooperation and disputation mingle pleasurably. Teachers also act as recorders (documenters) for the children, helping them trace and revisit their words and actions and thereby making the learning visible (Project Zero & Reggio Children, Italy, 2001). They provide instruction in tool and material use as needed, help find materials and resources, and scaffold children's learning—sometimes entering "inside the group of children," sometimes remaining attentively "on the outside." (For a detailed and illustrated description of a "castle project," go to http://child.etsu.edu/center/training/reggio/reggio.htm.) The physical environment (the "amiable" school) receives much attention and supports exchange and relationships through physical qualities of transparency, reflectiveness, openness, harmony, softness, and light (Ceppi & Zini, 1998; Gandini, 1993). A classroom atmosphere of playfulness and *joy* pervades. The school and surrounding community welcome the children into their culture and toward democratic participation.

Assessment, Evaluation, and Research

In all three approaches, children are assessed by means other than traditional tests and

grades. Instead, parents receive extensive descriptive information about their children's daily life and progress and share in culminating productions or performances. Portfolios or other products of children's individual and group work may be displayed and sent home at key intervals and transitions. In Reggio Emilia and other cities in Italy (Gandini & Edwards, 2001), teachers prepare *diarios,* or memory books, to trace the experience of children under 3 through the infant-toddler years. Process research (formative evaluation) is central to program improvement and quality control in these approaches. A strong example is the Reggio Emilia strategy of *documentation* (Katz & Chard, 1996; Oken-Wright, 2001), a cooperative practice that helps teachers listen to and see the children with whom they work, thus guiding ongoing curriculum decisions and fostering teacher professional development through collaborative study and reflection (Gandini & Goldhaber, 2001). Documentation is also vital for systematically following and studying the ways that groups of children develop ideas, theories, and understandings (Project Zero & Reggio Children, Italy, 2001).

Child outcome research is not intrinsic to the way educators work in any of these three approaches. For Waldorf, testimonials of parents and graduates are gathered as examples and evidence of effectiveness (e.g., *Learning to Learn* from AWSNA, n.d.), and creativity also has been studied (Ogletree, 1996). Administrators in Reggio Emilia have used parent interviews and questionnaires to gather information about their programs (see Fontanesi, Gialdini, & Soncini, 1998). Findings from formal exit interviews with parents at the Model Early Learning Center in Washington, DC, are reported in Lewin (1998, pp. 354-356). However, Reggio and Reggio-inspired educators consider pedagogical documentation to be an instrument for "reflection and democracy" not assessment (Dahlberg, Moss, & Pence, 1999; Gandini & Goldhaber, 2001; Oken-Wright, 2001; Rinaldi, 2001b).

Yet as the three approaches increasingly interact with the world of public school education, dialogue is leading to greater focus on authentic and valid ways of conducting assessment and evaluation. The American Montessori Association issued a position paper on "Learning and Assessment" that recommends that assessment procedures in American classrooms move toward formats (such as portfolios, presentations, multimedia projects) that more authentically gauge children's ability to interrelate ideas, think critically, and use information meaningfully (http://www.amshq.org). Montessori education has been the most friendly of the three approaches to empirical research on child learning outcomes. Many studies have demonstrated the effectiveness of Montessori methods and provided insight into children's gains with respect to reading and literacy, mathematics, and motivation (e.g., Chattin-McNichols, 1992a; Loeffler, 1992; Miller & Bizzell, 1983; Takacs, 1993; Haines, 2000; see summary at http://www.montessori-namta.org/generalinfo/rschsum.html). The American Montessori Association sponsors a Teachers' Research Network to promote teacher reflection on classroom practice (http://www.amshq.org). Their activities include training teachers in working with research mentors, interpreting research, framing questions, using qualitative and quantitative methods, and conducting joint comparative studies between types of schools. The organization also sponsors an annual dissertation award to promote research on Montessori education.

The research community distinguishes between types of research based on the purposes for which it is conducted. The process research favored by educators in Reggio Emilia promotes reflective practice and program improvement through formative methods that

help educators to better understand the context of their problems, assess the needs and responses of their stakeholders, and analyze "what works and what does not" on an ongoing basis. However, although such research assists educators while programs are ongoing to refine and improve their work, it does not allow outside audiences to understand outcomes and measure impacts over time. While we have some research on Montessori education, some policy makers continue to ask for new studies of Waldorf and Reggio Emilia schools that would measure lasting child-related outcomes and evaluate program quality based on external criteria. As discussed above, educators in dialogue with Reggio Emilia strongly question the validity and usefulness of such research (Dahlberg, Moss, & Pence, 1999). Nevertheless, educational researchers today are much more sophisticated in designing studies involving a variety of qualitative and quantitative methods, including interviews, observations, focus groups, and surveys, as well as ethnographic and narrative techniques, in addition to appropriate and innovative testing and authentic child assessment. These methods could be used to study classrooms, children, and families in ways that would supply a new kind and level of information to validate the effectiveness of the approaches, analyze their specific and unique strengths and weaknesses, and explain how and why children often thrive in and parents support the three progressive educational approaches that we have described.

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University of Minnesota

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Introduction

In 1987, the National Association for the Education of Young Children published *Keeping Current in Child Care Research: An Annotated Bibliography,* by Carollee Howes. This valuable resource reviewed child care research through 1987. In 1999, the Center for Early Education and Development updated the original review to include studies from 1987 to 1999. This update was created for participants in the second Annual Minnesota Child Care Research Conference: Welfare Reform and the Lives of Children. We believe, however, that a wider audience will find this update useful.

This update is organized in the same format as the original bibliography. The first four sections review research that continues to address questions raised in the 1970s: Will child care attendance be harmful to the child? What benefits do children receive from child care? Can child care serve as an effective intervention program in the short and long term? For example, we include recent data from the Abecedarian project, begun in 1972. This longitudinal study details the effectiveness of child care as an intervention for at-risk children.

The next five sections highlight studies that address research questions begun in the 1980s. What features distinguish high- from low-quality child care? What are the effects of age of entry, length of day, and total time in child care? What is the relation between family factors and child care? These sections include information from several well-known studies that have greatly impacted how we think about child care, such as the Cost, Quality, and Outcomes Study; the Florida Quality Improvement Study; and the National Child Care Staffing Study.

Finally, we created new sections for studies on family child care and inclusive settings. These two areas have been studied extensively since 1987, with enough research that a separate section for each seemed warranted.

Most of the research in our update continues to examine questions posed earlier, yet new questions continue to emerge. For example, just when those in the early childhood field have begun to feel more confident about what constitutes high-quality child care (low staff turnover, high-quality teacher-child interactions, safe and healthy environments, etc.), many people have begun to notice that parents often disregard the advice of child care experts. Thus, we are beginning to ask questions such as: What do parents actually look

for when they choose child care? How well is the current child care system meeting the needs of parents, especially single mothers, who are leaving welfare? It is our hope that this update will provide a comprehensive look at what we have learned about child care so far, so that early childhood professionals will use that information to continue searching for answers to both the old and the new questions.

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Attachment

Reference	Sample Description	Measures	Results
Belsky & Rovine (1988)	Data from 2 longitudinal studies of infant and family development were combined and analyzed 149 infants (90 males) Ages 12 and 13 months 20 or more hours of care per week Working class and middle class SES Married parents	Interviews Strange Situation	1. Infants exposed to 20 or more hours of care per week were more likely to be classified as insecurely attached to the mother and to avoid the mother on reunion than were infants in care fewer than 20 hours per week.
Lamb, Sternberg, & Prodromidis (1992)	Data from 13 studies were combined and analyzed 897 infants (493 males) and their mothers Ages 11 to 24 months Mothers averaged 32.6 hours of paid work per week	Strange Situation	1. Secure attachments were significantly more common among infants in exclusive maternal care. 2. Insecure attachments were significantly more common among those infants assessed after 15 months of age and among those who entered care between 7 and 12 months of age, rather than before. 3. Extent of nonmaternal care was not significantly associated with attachment classifications.
NICHD Early Child Care Research Network (1997)	1,153 mothers and their babies chosen from among 31	Assessment of Infant Security Attachment	1. Use of non-maternal care did not make a significant difference in children's attachment security.

	hospitals in 9 states 24% ethnic minority 14% single mothers	Strange Situation Attitude toward Maternal Employment Questionnaire Infant Temperament Questionnaire NEO Personality Inventory Center for Epidemiological Studies Depression Scale Infant Toddler HOME Scale Observational Record of the Caregiving Environment	2. Infants were less likely to be secure when low maternal sensitivity/responsiveness was combined with poor-quality child care, more than minimal amounts of child care, or more than one care arrangement. 3. Boys who were in many hours of care and girls who were in minimal hours of care were somewhat less likely to be securely attached.

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Social Development

Reference	Sample Description	Measures	Results
Andersson (1989)	119 Swedish children from their first year up to the age of 8 Ages 3 and 4 years at start of study	Cognitive measures Social competence	1. Children entering day care at an early age performed significantly better on cognitive tests and received more positive ratings from their teachers in terms of school achievement and social-personal attributes than did children entering day care at later ages and those in home care. 2. The author hypothesizes that two factors contribute to these positive results: Sweden's policy of providing for parents to stay home with children for the first 6 months of their lives and the generally high quality of Swedish day care.
Deater-Deckard, Pinkerton, & Scarr	141 mothers, 140 caregivers, and 72	Early Childhood Environmental Rating Scale	1. Average center quality was low.

(1996)	teachers Majority European American 84% two-parent families	Infant/Toddler Environmental Rating Scale Parenting Stress Index Marshall Emotional Support Scale Parental Discipline Interview EAS Temperament Scale	2. Indicators of center quality were generally unrelated to mother and teacher ratings of behavioral adjustment (although there was some indication that teachers with more training experienced fewer conduct problems).
Dunn (1993)	60 children in 30 classrooms in 24 centers 90% White, 10% African American Middle SES 77% two-parent families Ages 3 to 5 years	Observational assessment, staff interviews, and questionnaires to measure classroom quality Direct assessment, teacher ratings, and child achievement tests to measure child outcomes	1. Children with married parents and those attending centers that offered less variety and more guidance were rated as better socially adjusted. 2. Children attending centers that provided more total limits had higher levels of complex social play. 3. Child:staff ratio and group size did not predict children's social and cognitive development.
Hestenes, Kontos, & Bryan (1993)	60 children in 26 centers (30 classrooms) Range of SES Race/ethnicity data not provided Ages 3 to 5 years	Observational assessment of classroom quality Direct assessment of child outcomes	1. Low levels of classroom engagement by teachers predicted more intense negative affect among children. 2. Children whose teachers showed high levels of classroom engagement displayed more intense positive affect (temperament and child demographics were controlled).
Holloway & Reichhart-Erickson (1988)	55 children attending 15 day care centers and nursery school (30 boys) 4% African American, 94% White, 2% Asian Mostly middle SES	Three scales from the Early Childhood Observation Instrument:Teacher-Child Interaction, Child-Child Interaction, and Physical Environment Child social problem solving was measured using an adapted procedure by Spivack & Shure	1. Children engaging in high-quality interactions with teachers and children attending centers with lower child:teacher ratios scored higher on test of social reasoning skills. 2. In centers that were

	91% two-parent families Age 4 years		better able to accommodate groups of varying sizes, had smaller classes, and offered a variety of age-appropriate materials, children scored higher on test of social reasoning skills. 3. In centers with a more spacious layout, children spent more time in focused, solitary play and less time observing. 4. Quality indicators were not significantly related to negative or positive social interactions with peers.
Howes & Hamilton (1993)	72 children (48 at follow-up) 5 centers (and one large family day care home) at start 54 centers over course of study 14% African American, 61% White, 25% Hispanic or Asian 67% middle SES Ages 1 to 2 years Follow-up at ages 4 to 5 years	Observational assessment of quality Direct assessment of child outcomes	1. Children having more changes in teachers were rated as lower in positive and gregarious behaviors and higher in social withdrawal and aggression. 2. Children who had secure teacher-child relationships (or relationships that changed in a positive direction) had more positive, gregarious, and prosocial interactions with their peers and were less withdrawn and aggressive. 3. Changes in children's child care center or setting were not related to children's social competence with peers.
Howes, Phillips, &	414 children	Waters and Deane Attachment	1. Children cared for

Whitebook (1992)	21% African American, 73% White SES includes subsidized children care centers and children of wealthy families Ages 15 to 54 months	Q-set Early Childhood or Infant/Toddler Environmental Rating Scale Peer Play Scale	in classrooms meeting Federal Interagency Day Care Requirements (FIDCR) ratios were more likely to be in classrooms rated good or very good in caregiving and activities. They were more likely to be securely attached to teachers and were more competent with peers. 2. Children in classrooms meeting FIDCR groups size were more likely to be in classrooms rated higher in classroom activities. They were more likely to orient to both adults and peers and were more competent with peers. 3. Children in classrooms rated higher on "appropriate caregiving" were more likely to be classified as secure. 4. Children in classrooms rated higher on "developmentally appropriate activities" were more likely to be both adult and peer oriented.
Howes, Smith, & Galinsky (1995)	880 children in 150 centers Range of SES and urban/rural settings in FL Ages 10 months to 5 years	Director interviews Arnett Scale of Caregiver Sensitivity Howes Involvement Scale Early Childhood Environmental Rating Scale Infant/Toddler Environmental Rating Scale Revised Howes Peer Play Scale Howes Object Play Scale	1. Changing child:teacher ratio requirements for infants from 6:1 to 4:1, and for toddlers from 8:1 to 6:1, resulted in more complex child play both with peers and objects, more secure attachment to caregivers, greater adaptive language proficiency, and fewer behavior problems (including aggression, anxiety, and

		Adaptive Language Inventory Preschool Behavior Questionnaire	hyperactivity). 2. Children in classrooms meeting professional standards for child:teacher ratios engaged in more elaborate peer play and had higher adaptive language scores, compared with children in classrooms with higher child:teacher ratios. 3. Children in classrooms that improved by shifting to teachers with CDA credentials or CDA equivalency had the largest increase in complexity of peer play and security of caregiver attachment. Children in classrooms with college-educated teachers who had early childhood training engaged in more complex peer play, had a more secure attachment with their caregiver, and had higher adaptive language scores. 4. After changes, teachers were more sensitive, positive, and responsive with children. 5. After changes, children evidenced more secure attachment and were rated as having fewer behavior problems.
Kontos (1991)	100 children in 10 centers (5 urban/nonprofit, 3 urban/profit, 1 rural/nonprofit, and 1	Child Development Program Evaluation-Indicator Checklist Caregiver Observation Form	1. Both family background and child care quality predicted children's development.

	rural/profit) 53 male Ages 3 to 5 years	Early Childhood Environmental Rating Scale Slosson Intelligence Test Test of Early Language Development Adaptive Language Inventory Preschool Behavior Questionnaire Classroom Behavior Inventory	2. Child care quality variables were significant predictors of social adjustment and marginal predictors of sociability.
McCartney et al. (1997)	120 centers from MA, VA, and GA 718 infants, toddlers, and preschoolers	Parental Modernity Scale Perceived work-family interference Parenting stress interference Assessment Profile for EC Programs Early Childhood Environmental Rating Scale Infant/Toddler Environmental Rating Scale Waters Attachment Q-set Social behavior observations	1. Few associations between teacher-child interaction and social outcomes were noted. 2. Teacher-child interactions were associated with social bids by preschoolers and toddlers. 3. Higher work-family interference was associated with poorer social outcomes. 4. Children in nonprofit centers had better social outcomes on some measures.
Peisner-Feinberg & Burchinal (1997) (Part of Cost, Quality, and Outcomes Study)	828 children in CA, CT, CO, and NC (52% boys) One-third ethnic minorities Two-thirds two-parent families	Early Childhood Environmental Rating Scale Early Childhood Observation Form Adult Involvement Scale Peabody Picture Vocabulary Test-Revised Attitudes/perceptions of competence Student-Teacher Relationship Scale	1. There is a positive relation between child care quality and children's cognitive and socio-emotional outcomes. 2. Stronger positive effects of child care outcomes were observed for children from more at-risk backgrounds. 3. There was no evidence that children from more advantaged families were buffered from the effects of poor-quality care.
Peisner-Feinberg, Clifford, Culkin, Howes, & Kagan (1999)	By second grade, 418 children from the original Cost, Quality, and	Early Childhood Environmental Rating Scale Caregiver Interaction Scale	1. Children in higher-quality child care centers performed better on

	Outcomes Study 51% boys 30% children of color	UCLA EC Observation Form Adult Involvement Scale Instructional Environment Observation Scale (Second Grade) Student-Teacher Relationship Scale Peabody Picture Vocabulary Test-Revised Woodcock-Johnson Tests of Achievement-Revised Inventory of Classroom Behavior Teacher Assessment of Social Behavior Parent surveys	measures of cognitive skills and social skills. 2. Quality of care continued to affect development at least through kindergarten and, for many, through second grade. 3. Children who were at-risk were more sensitive to the negative effects of poor-quality care, and received more benefits from high-quality care. These benefits were sustained through second grade. 4. The quality of the classroom affects cognitive skills, and the teacher-child relationship influences social skills. 5. Children who attended higher-quality child care had better cognitive and social skills in second grade, even after taking into account kindergarten and second-grade classroom experiences. 6. Children who experienced more positive classroom climates in child care had better relationships with peers in second grade.
Phillips, McCartney, & Scarr (1987)	166 families in 9 centers in Bermuda Ages 36 to 68 months	Early Childhood Environmental Rating Scale Director interviews of classroom characteristics, ratios, caregiver training, director experience, etc.	1. Overall quality, caregiver-child verbal interactions, and director experience were each highly predictive of children's social development in child care.

		Classroom Behavior Inventory Preschool Behavior Questionnaire Parent as Educator Interview	2. Family background characteristics were also significantly predictive of several social outcomes.
Vandell & Corasaniti (1990)	236 predominantly middle class 8-year-olds 84% White, 8% Black, 3% Asian American 72% two-parent families State with **minimal** child care standards	Retrospective parental recollections Teacher ratings of social, emotional, and academic functioning Classroom sociometric ratings Children's self-ratings Academic grades Conduct grades Standardized test scores	1. Children with more extensive child care experiences since infancy were rated as having poorer peer relationships, work habits, and emotional health. 2. Extensive infant care was associated with poorer academic and conduct report card grades and lower standardized test scores.
Vandell, Henderson, & Wilson (1988)	20 White, middle-class 4-year-olds and 8-year-olds (same sample over a 4-year period) in 6 day care centers of varying quality	Observational assessment of classroom quality Direct and videotaped assessment of children Maternal, peer, and observer ratings of child behavior	1. Children in higher-quality day care were rated as more socially competent, had fewer unfriendly peer interactions, were happier, and received fewer shy nominations from peers. 2. Significant continuity of behaviors was found from age 4 to age 8. 3. Having positive interactions with adults at age 4 was significantly correlated with ratings of empathy, social competence, and peer acceptance at age 8.

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Cognitive Development

Reference	Sample Description	Measures	Results
Andersson (1989)	119 Swedish children from their first year up to the age of 8 years Ages 3 and 4 years at start of study	Cognitive measures Social competence	1. Children entering day care at an early age performed significantly better on cognitive tests and received more positive ratings from their teachers in terms of school achievement and social-personal attributes than did children entering day care at later ages and those in home care. 2. The author hypothesizes that two factors contribute to these positive results: Sweden's policy of providing for parents to stay home with children for the first 6 months of their lives, and the generally high quality of Swedish day care.
Burchinal, Roberts, Nabors, & Bryant (1996)	79 African American children attending centers in 2 small adjacent southeast cities 69% of families were under 185% of federal poverty 68% headed by a single parent	Bayley Scales of Infant Development Sequenced Inventory of Communication Development Communication and Symbolic Behavior Scales	1. Child care quality was positively correlated with cognitive development, language development, and communication skills.

		Infant/Toddler Environmental Rating Scale Early Childhood Environmental Rating Scale HOME for Infants	2. Process measures of quality of care independently related to the infant's cognitive development. 3. Infant:adult ratio independently related to the infant's overall communication skills.
Caughy, DiPietro, & Strobino (1994)	867 children from the National Longitudinal Survey of Youth (464 boys) 47% non-Black/non-Hispanic; 34% Black; 19% Hispanic Ages 5 to 6 years	HOME Scale (shortened version) Peabody Individual Achievement Test	1. Children from "impoverished home environments" who attended day care during the first 3 years of life scored higher on reading recognition tests and math tests. 2. The effects on reading scores were greatest for children who began day care before the age of 1. 3. The effects on math scores were greatest for children in center care.
Dunn (1993)	60 children in 30 classrooms in 24 centers 90% White, 10% African American Middle SES 77% two-parent families Ages 3 to 5 years	Observational assessment, staff interviews, and questionnaires to measure classroom quality Direct assessment, teacher ratings, and child achievement tests to measure child outcomes	1. Children attending classrooms with higher overall quality and whose caregivers had a child-related college major and less experience in the center scored higher on a test of intelligence. 2. Child:staff ratio and group size did not predict children's social and cognitive development.
Howes, Smith, & Galinsky (1995)	880 children in 150 centers Range of SES and urban/rural settings in FL Ages 10 months to 5 years	Director interviews Arnett Scale of Caregiver Sensitivity Howes Involvement Scale	1. Gains in intellectual and emotional development continued to improve from 1994.

		Early Childhood Environmental Rating Scale Infant/Toddler Environmental Rating Scale Revised Howes Peer Play Scale Howes Object Play Scale Adaptive Language Inventory Preschool behavior questionnaire	2. Children were more actively engaged and spent more time learning than they did in 1992 and 1994. 3. Teachers were overall more responsive. Teacher sensitivity and classroom quality did not increase or decrease.
Peisner-Feinberg & Burchinal (1997) (Part of Cost, Quality, and Outcomes Study)	828 children in CA, CT, CO, and NC (52% boys) One-third ethnic minorities Two-thirds two-parent families	Early Childhood Environmental Rating Scale Early Childhood Observation Form Adult Involvement Scale Peabody Picture Vocabulary Test-Revised Attitudes/Perceptions of Competence Student-Teacher Relationship Scale	1. There is a positive relation between child care quality and children's cognitive and socioemotional outcomes. 2. Stronger positive effects of child care outcomes were observed for children from more at-risk backgrounds. 3. There was no evidence that children from more advantaged families were buffered from the effects of poor-quality care.
Peisner-Feinberg, Clifford, Culkin, Howes, & Kagan (1999)	By second grade, 418 children from the original Cost, Quality, and Outcomes Study 51% boys 30% children of color	Early Childhood Environmental Rating Scale Caregiver Interaction Scale UCLA Early Childhood Observation Form Adult Involvement Scale Instructional Environment Observation Scale (Second Grade) Student-Teacher Relationship Scale	1. Children in higher-quality child care centers performed better on measures of cognitive skills and social skills. 2. Quality of care continued to affect development at least through kindergarten and, for many, through second grade. 3. Children who were at-risk were more sensitive to the

		Peabody Picture Vocabulary Test-Revised Woodcock-Johnson Tests of Achievement-Revised Inventory of Classroom Behavior Teacher Assessment of Social Behavior Parent surveys	negative effects of poor-quality care and received more benefits from high-quality care. These benefits were sustained through second grade. 4. The quality of the classroom affects cognitive skills, and teacher-child relationship influences social skills. 5. Children who attended higher-quality child care had better cognitive and social skills in second grade, even after taking into account kindergarten and second-grade classroom experiences. 6. Children who experienced more positive classroom climates in child care had better relationships with peers in second grade.
Vandell & Corasaniti (1990)	236 predominantly middle-class 8-year-olds 84% White, 8% Black, 3% Asian American 72% two-parent families State with **minimal** child care standards	Retrospective parental recollections Teacher ratings of social, emotional, and academic functioning Classroom sociometric ratings Children's self-ratings Academic grades Conduct grades Standardized test scores	1. Children with more extensive child care experiences since infancy were rated as having poorer peer relationships, work habits, and emotional health. 2. Extensive infant care was associated with poorer academic and conduct report card grades and lower standardized test scores.
Whitebook, Howes, & Phillips (1989) (National Child Care	227 day care centers High, middle, and low SES families	Early Childhood Environmental Rating Scale and Infant/Toddler Environmental Rating	1. Child care staff education and work environments affect quality of services

Staffing Study)	1,309 teachers/staff were interviewed, and 260 children were assessed	Scale Scale of Staff Sensitivity Child Assessments of Waters and Deane Attachment Q-set and the Howes Peer Play Scale Feagans and Farran Adaptive Language Inventory Peabody Picture Vocabulary	children receive. 2. Children in lower-quality centers were less competent in language and social development.

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Child Care as Early Intervention

Reference	Sample Description	Measures	Results
Frank Porter Graham Child Development Center (1999) (Abecedarian Project)	Same sample from original study (above), followed through 1999	Language and cognitive tests Demographic data	1. Young adults who received early educational intervention had significantly higher mental test scores from toddlerhood through age 21 than did those who were not in a treatment group. 2. Enhanced language skills probably increased the effects of intervention on cognitive skills. 3. Reading achievement scores were higher among those who received intervention. The differences between groups remained through age 21. 4. Medium effects were seen for math achievement. 5. Those who were treated were more likely to be in school at age 21. 6. 35% of treatment group graduated from a 4-year college; 14% in control group graduated from a 4-year college. 7. Intervention group

			members were an average of 1 year older when their first child was born.
Ramey & Campbell (1991) (Abecedarian Project)	Approximately 90 children identified as being at-risk for academic underachievement Mostly African American	Wechsler Preschool and Primary Scale of Intelligence (at 60 months) Wechsler Intelligence Scale for Children-Revised (at 78 and 96 months) Academic achievement tests (in elementary grades) Classroom Behavior Inventory Child Behavior Checklist	1. Positive effects of intervention were reported on children's intellectual competence and academic achievement (reading and math). Less grade retention was also reported. 2. No significant effects were found in parents' perceptions of behavior. 3. These positive effects were proportional to the amount of intervention received.
Schweinhart, Barnes, Weikart, Barnett, & Epstein (1993) (The High/Scope Perry Preschool Study through Age 27)	123 children from African American families in Ypsilanti, MI (includes control with no preschool experience) Annual assessment from Ages 3 to 11 years Ages 14 to 15 years Age 19 years Age 27 years 4.9% cases missing	Demographic data	At age 27, program group had: 1. Significantly higher monthly earnings. 2. Significantly higher percentage of home ownership and second car ownership. 3. Significantly higher level of schooling completed (71% completed 12th grade or higher). 4. Significantly lower percentage receiving social services. 5. Significantly fewer arrests.
Wasik, Ramey, Bryant, & Sparling (1990)	64 infants judged to be at-risk for delayed development (assigned to three groups: child development center plus family education, family education, and control group)	Bayley Scales of Infant Development (at 6, 12, and 18 months) Stanford-Binet Intelligence Test (at 24, 36, and 48 months) McCarthy Scales of Children's Abilities (at 30, 42, and 54 months) HOME Inventory	1. After assessment at 6 months, subsequent scores on developmental assessments were greater for children in the child care plus family education group than in the other two groups.

		(Although the quality of the Frank Porter Graham Child Development Center was not assessed, this program is widely considered to be a high-quality program)

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Specific Indicators of Child Care Quality

Reference	Sample Description	Indicators	Measures	Results
Arnett (1989)	59 caregivers in 22 centers in Bermuda Children were preschool age Level 1: no training Level 2: two training courses Level 3: four-course Bermuda College training program Level 4: 4-year college education in ECE or related subject	Caregiver training	Paternity Modernity Scale (childrearing attitudes) Caregiver Interaction Scale	1. Training is related to attitudes and behavior of caregivers. Training is related to less authoritarian child-rearing attitudes, and more positive interaction style, less punitiveness, less detachment. 2. Caregivers with Level 4 training were distinct from the other three groups—they were least authoritarian, highest in interaction factors, less punitive, and less detached.
Gallagher, Rooney, & Campbell (1999)	Licensing requirements in NC, CO, CT, and CA Results of the Cost, Quality, and Child Outcomes Study	State licensing requirements		1. State regulations focus more on child protection than they do on enhancing child development. 2. Child care regulations do not match what we tend to call "quality."
Ghazvini & Readdick (1994)	12 child care centers	Parent-caregiver communication	Parental Perceptions of	1. Caregivers rated all forms of

	subsidized and nonsubsidized centers		Communication Questionnaire Early Childhood Environmental Rating Scale	parent-caregiver communication as more important and occurring more frequently than did parents. 2. Frequency of parent-caregiver communication and quality of child care were positively correlated.
Howes (1997) (Analysis of Cost, Quality, and Outcomes Study, and Florida Quality Improvement Study)	Study 1: 655 full-day classrooms in CA, CO, CT, and NC; 760 children Study 2: 410 classrooms in FL; 820 children	Adult:child ratio Teacher background	Study 1: Teacher reports, Classroom Interaction Scale, Adult Involvement Scale, PPVT, WJ-R Study 2: Teacher reports, Adult Involvement Scale, Revised Peer Play Scale	1. Teachers with the most education were the most effective. 2. In the CQO Study, classrooms that complied with professional standards had more effective teachers and more positive child outcomes. 3. No interactive effects between ratio and teacher background were found.
Howes & Norris (1997)	100 family child care homes observed originally 28 providers who did enroll additional children were revisited	Group size Age mix	Family Day Care Environmental Rating Scale	1. Providers were similar in environmental quality scores before and after adding 2 additional school-age children. 2. Providers were rated as less sensitive on the post-enrollment visit. 3. Provider and children's activities were similar on the two visits.
Kontos, Howes, & Galinsky (1996)	130 family providers and 112 comparison providers in CA, TX, and NC Providers in study group received training	Provider training	Provider demographics Interviews Arnett Scale of Provider Sensitivity Adult Involvement	1. Providers who seek training are not substantially different in quality of care offered. 2. Training can have a modest positive effect on several

			Scale Family Day Care Rating Scale	aspects of quality and intentionality.
Love, Ryer, & Faddis (1992)	112 volunteer classrooms that were randomly assigned to staff:child ratios of 1:8, 1:9, and 1:10	Adult:child ratios Teacher training DAP Caregiver behavior	Classroom interview Staff characteristics interview Program director interview Assessment Profile for Early Childhood Programs Arnett Scale of Caregiver Behavior Preschool Classroom Snapshot Developmental Practices Inventory Child Stress Behavior Instrument Behavior Problem Index	1. Increasing staff ratios from 1:8 to 1:9 or 1:10 did not have a measurable effect on program quality. 2. Classrooms with higher ratings on structure variables had instructional activities and caregiver-child interactions that were more developmentally appropriate, and there was less crying and fighting observed among children. 3. In classrooms that were more developmentally appropriate, caregivers were more attentive and encouraging, less harsh and critical, and less detached in their interactions with children. 4. There was less stress behavior among children when caregivers were rated as being attentive and encouraging. 5. There was some evidence that caregivers with higher levels of EC training implemented more developmentally appropriate classrooms.
NICHD Early Child Care Research Network (1996)	576 infants in centers, child care homes, in-home sitting	Adult:child ratio Type of care	Observational Record of the Caregiving Environment	1. Caregivers were rated as providing more positive caregiving when

	arrangements, with grandparents, and with fathers Age 6 months	Caregiver beliefs Environment	(developed by NICHD) HOME Inventory Assessment Profile for Early Childhood Programs Caregiver interviews and questionnaires	group sizes and child:adult ratios were smaller and when caregivers held less authoritarian beliefs about child rearing. 2. In addition, small group size, and safe, clean, and stimulating physical environments were consistently associated with positive caregiving behaviors in each setting.
Olenick (1989)	204 classrooms in 100 centers in CA One-third subsidized programs	Adult:child ratios Training Work environment	Early Childhood Environmental Rating Scale Indirect costs Direct costs	1. Quality is affected by cost factors. 2. Programs that allocate resources to staff are most likely to be high-quality programs.
Phillipsen, Burchinal, Howes, & Cryer (1997)	224 infant/toddler and 509 preschool classrooms Nonprofit and for-profit 4 states: CA, CO, CT, and NC	State regulations Profit/nonprofit Caregiver characteristics Work environment	Early Childhood Environmental Rating Scale Infant/Toddler Environmental Rating Scale Caregiver Interaction Scale Teacher Involvement Scale	1. Overall, process quality (children's interactions with materials and adults) was higher in states with more stringent child care regulations, nonprofit centers, and preschool classrooms. 2. In infant/toddler classrooms, process quality was higher in classrooms with moderately experienced and better paid teachers, and more experienced directors. 3. In preschool classrooms, process quality was higher in classrooms with teachers with more education, a moderate amount of experience, and higher wages.

Scarr, Eisenberg, & Deater-Deckard (1994)	120 classrooms in each of 3 states (GA, VA, and MA) Ages less than 12 months to 60 months 21% African American, 73% White Roughly equal groups of infants, toddlers, and preschoolers	Work environment, ratios, group size	Infant/Toddler Environmental Rating Scale Early Childhood Environmental Rating Scale Assessment Profile for Preschool Programs Waters & Deane Attachment Q-set Peer Play Scale (revised)	1. Highest wage paid to a teacher was best indicator of process quality. 2. Ratios, group sizes, and staff turnover were less well correlated with process quality. 3. More than 80% of classrooms had some appropriate caregiving and activities. 4. Children in better-quality classrooms were more securely attached to teachers and more competent with peers. 5. Variations in quality correlated with structural variables such as group size and ratios.
Whitebook, Howes, & Phillips (1989) (National Child Care Staffing Study)	227 day care centers High, middle, and low SES families 1,309 teachers/staff were interviewed, and 260 children were assessed	Staff characteristics such as training and education, wages, and work environment	Early Childhood Environmental Rating Scale Infant/Toddler Environmental Rating Scale Scale of Staff Sensitivity Child assessments of Waters & Deane Attachment Q-set Howes Peer Play Scale Feagans and Farran Adaptive Language Inventory Peabody Picture Vocabulary	1. Child care staff education and work environments affect quality of services children receive. 2. The most important predictor of quality of care received among adult work environment variables is staff wages. 3. Better-quality centers are more likely to be operated as nonprofits, accredited by NAEYC, and located in states with higher-quality standards.
Whitebook, Howes, & Phillips (1998)	158 samples from original sample	Work environment	Telephone interviews with	1. Child care teaching staff

(National Child Care Staffing Study)			directors	continue to earn unacceptably low wages, even in a sample of relatively high-quality centers. 2. Increased public funding is rarely targeted to quality improvements (and so has not resulted in better wages or lower staff turnover). 3. Child care centers continue to experience high turnover. 4. Centers with lower turnover were rated higher in quality. 5. Although health coverage has improved, majority of centers still offer limited or no health coverage.

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Effects of Overall Child Care Quality

Reference	Sample Description	Quality Index	Measures	Results
Cost, Quality, and Child Outcomes Study Team (1995)	826 children in 181 centers Age 4 Centers in CA, CO, CT, and NC 15% African American, 68% White, 6% Hispanic, 4% Asian 63% of mothers have less than a bachelor's degree	Ratios Staff education and training Staff wages Experience of administrators Early Childhood Environmental Rating Scale Infant/Toddler Environmental Rating Scale	Early Childhood Environmental Rating Scale Infant/Toddler Environmental Rating Scale Staff questionnaires (from National Child Care Study) Caregiver Interaction Scale Teacher Involvement Scale Peabody Picture Vocabulary Test Woodcock-Johnson Tests of Achievement-Revised Classroom Behavior Inventory Student-Teacher Relationship Scale Attitudes/Perceptions of Competence Scale	1. Quality correlated with higher child:staff ratios, staff education, and experience of administrator. 2. Wages, education, and specialized training most important in differentiating between poor-, mediocre-, and good-quality centers. 3. Higher classroom quality index was associated with positive greater receptive language ability, higher premath skills, more advanced social skills, and more positive self-perceptions. 4. Effect of quality on receptive language was greater for minority children. 5. States with better licensing

				standards had fewer poor-quality centers. 6. Quality was poor to mediocre in nearly half of infant/toddler rooms; parents overestimated quality of care.
Howes (1988)	75 children enrolled in laboratory elementary school 12% African American, 69% White, 12% Hispanic, 6% Asian Mother's median education level = 14 years 70% two-parent families Child care experience at age 4: follow-up at first grade	Observational measures of classroom quality	Observational measures of classroom quality Teacher ratings of child outcomes	1. For girls, stable child care arrangements predicted academic skills, controlling for family characteristics. 2. For boys, stable arrangements and high-quality care predicted academic skills, controlling for family characteristics. 3. For both boys and girls, high-quality care predicted enhanced school skills and low behavior problems.
Howes & Smith (1995)	840 children 435 girls Center-based Ages 10 to 70 months 66% White, 34% African American 150 centers in FL	Early Childhood Environmental Rating Scale Infant/Toddler Environmental Rating Scale Teacher education and training	Attachment Q-set Early Childhood Environmental Rating Scale Infant/Toddler Environmental Rating Scale	1. Quality was minimally adequate. 2. Classrooms with more educated and trained teachers had higher Infant/Toddler Environmental Rating Scale and Early Childhood Environmental Rating Scale scores. 3. Children's cognitive activity is enhanced in classrooms rich in creative play activities and staffed by teachers who engage children in positive

				social interaction.
Kontos & Keyes (1999)	60 children (26 male) in 3 programs Middle to upper-middle SES Majority European American 6 non-native English speakers (fluent)	DAP criteria Teacher education	Observations via scan sampling Howes Involvement Scale	1. The probability of children engaging in complex interactions with objects and peers was related to classroom factors rather than to child characteristics. 2. Teacher interaction had no main effects on children's interactions with objects or peers.
Peisner-Feinberg, Clifford, Yazejean, Culken, Howes, & Kagan (1998)	Subsample from Cost, Quality, and Outcomes Study 826 children in year 1 560 children in year 2 448 children in year 3 One-half boys One-third ethnically diverse	Early Childhood Environmental Rating Scale Caregiver Interaction Scale UCLA Early Childhood Observation Form Adult Involvement Scale	Early Childhood Environmental Rating Scale Caregiver Interaction Scale UCLA Early Childhood Observation Form Adult Involvement Scale Peabody Picture Vocabulary Test-Revised Woodcock-Johnson Tests of Achievement-Revised Classroom Behavior Inventory Student-Teacher Relationship Scale	1. Children in better-quality child care have better cognitive and social outcomes. 2. These benefits apply to all children. 3. These benefits do last through the early school years.
Phillips, Scarr, & McCartney (1987)	166 children in 9 centers 78% Black Bermudians, 22% White	Staff:child ratios Director experience Caregiver	Early Childhood Environmental Rating Scale Interviews	1. Children in higher-quality care were rated by their parents as more considerate and sociable.

	Bermudians 68% two-parent families 85% spent most of work week in day care by age 2 years Ages 3 to 5½ years 3-month study, each center visited 3 times	turnover Child-adult verbal interactions	Assessment of child-adult verbal interactions Peabody Picture Vocabulary Test-Revised Preschool Language Assessment Instrument Preschool Behavior Questionnaire Classroom Behavior Inventory Parent questionnaires Parent as Educator Interview	2. Children in higher-quality care were rated by their teachers as more intelligent, more task oriented, and more anxious. 3. Quality of care was predictive of verbal intellectual functioning. 4. Age of entry and time in day care were poor predictors of children's development. 5. Amount of adult-child verbal interaction was a strong predictor of positive child outcomes. 6. Director experience was a strong predictor of positive child outcomes. 7. Verbal intelligence and language development was affected by staff:child ratios.

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Effects of Age of Entry

Reference	Sample Description	Age of Entry	Measures	Results
Andersson (1989)	119 Swedish children from their first year up to the age of 8 years Ages 3 and 4 years at start of study	6 months or older	Cognitive measures Social competence	1. Children entering day care at an early age performed significantly better on cognitive tests and received more positive ratings from their teachers in terms of school achievement and social-personal attributes than did children entering day care at later ages and those in home care. 2. The author hypothesizes that two factors contribute to these positive results: Sweden's policy of providing for parents to stay home with children for the first 6 months of their lives and the generally high quality of Swedish day care.
Caughy, DiPietro, & Strobino (1994)	867 children from the National Longitudinal Survey of Youth (464 boys) 47% non-Black/ non-Hispanic; 34% Black; 19% Hispanic Ages 5 to 6 years	Under age 1	HOME scale (shortened version) Peabody Individual Achievement Test	1. Children from "impoverished home environments" who attended day care during the first 3 years of life scored higher on reading recognition tests and math tests.

				2. The effects on reading scores were greatest for children who began day care before the age of 1.
Howes (1990)	80 children (same children examined in Howes & Olenick (1986)) 8 centers 9% African American, 74% White, 13% Hispanic, 1% Asian 76% two-parent families Ages 3 to 7 years (were 1½ to 3 years old in 1986)	Infancy	Observational assessment and caregiver reporting of classroom quality measures Direct assessment and parent and teacher ratings of child outcomes	1. Preschool children attending high-quality centers engaged in more social pretend activities, displayed more "positive affect" relative to angry and distressed behavior, and were rated by teachers as having sociable relations with peers. 2. Kindergarten children who entered lower-quality centers as infants were rated by teachers as more distractible, less task oriented, and less considerate compared with children who entered higher-quality centers as infants. 3. Among children enrolled as infants, child care quality (teacher socialization practices) best predicted child outcomes; among children enrolled as toddlers or preschoolers, family socialization practices best predicted child outcomes.

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Effects of Child's Total Experience in Child Care

Reference	Sample Description	Measures	Results
Bryant, Lau, Burchinal, & Sparling (1994)	145 Head Start children, 146 parents, and 32 teachers	Early Childhood Environmental Rating Scale DAP questionnaire for teachers Home Screening Questionnaire Kaufman Assessment Battery for Children Preschool Inventory Vineland Communication Domain Adaptive Social Behavior Inventory	1. 9% of classrooms met criteria for "good" on Early Childhood Environmental Rating Scale. 2. 71% of homes found to be "suspect," indicating little developmental stimulation. 3. No relationship between teacher variables and classroom quality were found. 4. Classroom quality did predict child outcomes on K-ABC Mental Processing and Achievement batteries and on the PSI measuring preacademic skills. 5. Teacher rating of child behavior was not related to quality of classroom or home environments.
Clarke-Stewart, Gruber, & Fitzgerald (1994)	150 (at the beginning of study) children in a variety of child care and home settings	Observations of home and child care settings Interviews with parents and	1. Children at home and children in day care had completely different experiences

		caregivers Children's cognitive and social development	during the day. 2. Children who were in child care centers were consistently more advanced in their development than were children who stayed home with mothers. 3. These advances were in cognitive development, social development, independence, dinnertime obedience, compliance requests, and social interactions with peers. 4. Children who spent more time in day care were most advanced in several areas, although this relationship was more complex. 5. Aspects of high-quality day care that seemed to be important in predicting development were structured learning opportunities, adult:child ratio and class size, opportunities to interact with other children, and a stimulating physical setting.
Epstein (1999)	109 Head Start classrooms 72 public school early childhood classrooms 110 private, nonprofit early childhood classrooms	Teacher interviews Arnett Global Rating Scale Early Childhood Environmental Rating Scale High/Scope Program Quality Assessment	1. Program quality in public schools was generally higher than other settings, especially in areas of teacher affect, motor development, and opportunities for plan and review.

	Two-thirds High/Scope 200 children 58% single-parent families 33% African American, 6% Latino American, 4% Middle Eastern American, 1% Native American Ages 3 to 5 years	High/Scope Child Observation Record Development Indicators for Assessment of Learning-Revised (DIAL-R)	2. The average level of program quality in all three settings was high (higher than in other current studies). 3. Center-based programs receiving subsidies are capable of operating at good or better levels of quality.
Field (1991)	Study 1: 28 children, 5 to 8 years, middle SES Study 2: 56 children (11.5 average age), middle SES Heterogeneous samples of race/ethnicity (including African American, White, Hispanic)	Child variables: self-drawing, Piers-Harris Self-Esteem, Internalizer/Externalizer, Behavior Rating Scale Parent/teacher variables: Internalizer/Externalizer, demographics Quality Indicators: For infants: separate sleep and play areas, teacher:infant ratio of 1:4 For toddlers: play areas, outdoor play, preschool prep curriculum, ratio of 1:5 For both: highly educated, stable teachers, with a positive atmosphere and high teacher morale	1. Study 1: Amount of time spent in full-time center care was positively correlated to the number of friends and extracurricular activities of the children. More time in the center was positively related to parents' ratings of the children's emotional well-being, leadership, popularity, attractiveness, and assertiveness, and negatively related to aggressivity. 2. Study 2: The more time spent in high-quality day care, the higher teachers rate children on emotional well-being, attractiveness, and assertiveness. The more time spent in high-quality day care, the more these children showed physical affection during peer interactions, were more often assigned to gifted programs, and received higher math grades.
Howes, Olenick, & Der-Kiureghian (1987)	30 kindergarten children (19 boys) attending one after-school program	Sociometric interview Behavior observation, including child-teacher and child-peer interactions	1. Children who attended the after-school program were more likely to be nominated as friends.

	One-third from single-parent families 15% special needs		2. The after-school experiences of these children were both complementary and continuous with their experiences in school.
Kontos (1991)	100 children in 10 centers Predominantly White Range of SES and urban/rural families 57% two-parent families Ages 3 to 5 years	Child Development Program Evaluation-Indicator Checklist Caregiver Observation Form Early Childhood Environmental Rating Scale Slosson Intelligence Test Test of Early Language Development Adaptive Language Inventory Preschool Behavior Questionnaire Classroom Behavior Inventory	1. Family background variables were significantly related to several measures of children's cognitive and language development. 2. Overall quality (a measure of a minimum level of quality) predicted better social adjustment scores and fewer behavior problems among children, controlling for family background and child care experience. 3. Age of entry into child care and duration of the child care experience were not significant predictors of child development outcomes.

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Relations between Family and Child Care

Reference	Sample Description	Measures	Results
Cryer & Burchinal (1997)	100 programs in CA, CO, NC, and CT (50 for profit, 50 nonprofit) 2,407 responses to preschool parent questionnaire and 727 responses to infant/toddler questionnaire Parents were mostly White (81%) and middle SES	Early Childhood Environmental Rating Scale Infant/Toddler Environmental Rating Scale Parent-adapted versions of Early Childhood Environmental Rating Scale and Infant Toddler Environmental Rating Scale Classroom observers	1. Parents gave high importance to scores for all aspects of care, with higher scores for interactions and health and safety items. 2. Parents gave their children's quality of care significantly higher ratings than did observers. 3. Easy to monitor aspects of care were rated more closely by observers and parents. 4. As parental values increased for an aspect of care, the difference between parent and observer quality scores increased.
Ghazvini & Readdick (1994)	12 child care centers Subsidized and nonsubsidized centers	Parental Perceptions of Communication Questionnaire Early Childhood Environmental Rating Scale	1. Caregivers rated all forms of parent-caregiver communication as more important and occurring more frequently than did parents. 2. Frequency of parent-caregiver communication and quality of child care were positively correlated.
Hofferth, Brayfield, Deich, & Holcomb (1991)	4,400 parents or guardians of children under the age of 13 (including families using care by relatives)	Telephone interviews	1. Quality was the characteristic most often cited in selecting their current arrangement.

	312 providers National sample		2. Parents cited provider-related aspects of quality as being the most important factor in choosing care. 3. 96% of parents were either very satisfied or satisfied with their current arrangement. 4. Families who desired a change cited quality as the reason and most often wanted to switch to a center or preschool.
Holloway & Reichhart-Erickson (1989)	55 children from 15 programs (32 boys) 52 Caucasian, 2 Black, and 1 Asian American Age 4 years	Adapted version of Spivack and Shure's problem-solving procedure Observations Teacher ratings of social competence Early Childhood Classroom Observation Scale	1. Mothers of socially competent children expected earlier acquisition of developmental skills. 2. Socially competent children attended programs with smaller classes and higher-quality caregiver-child interactions. 3. Mothers who expected early acquisition of developmental skills and those of higher SES tended to place their children in higher-quality child-care settings. 4. Caregiver-child interactions and group size contributed independently to children's social competence (controlling for home variables).
Kontos, Howes, Shinn, & Galinsky (1995)	820 mothers, 225 children, and 226 providers in CA, TX, and NC	Arnett Scale of Caregiver Sensitivity	1. Parents and providers agreed on most important elements: child safety, parent-provider

	42% White, 23% African American, 31% Hispanic Heterogeneous social classes and maternal educational levels 81% 2-parent families Ages 10 months to 5 years	Howes Involvement Scale Family Day Care Rating Scale Waters & Deane Attachment Q-set Smilansky's Cognitive Play Scale Limit Setting Measure Block & Block Child Rearing Attitudes Scale Adult Work Environment Providers' Perceptions of Quality	communication about child, warm relationship between provider and child. 2. 41% of mothers cited cost or convenience as important in their choice (often second). 3. 91% of mothers would choose the same provider again. 4. Children with more educated mothers and more responsive caregivers engaged in more high-level object play. 5. Higher global quality was related to more object play, more high-level object play, and better child attachment security. However, higher global quality was related to less high-level peer play. 6. Neither family background characteristics nor child care characteristics predicted children's language development or social adjustment. 7. Maternal working conditions and number of hours worked were unrelated to all aspects of children's development.
Schliecker, White, & Jacobs (1991)	100 children in 10 centers Predominantly White Range of SES 63% two-parent families Age 4 years	Observational assessment of classroom quality Direct assessment of child outcomes	1. Day care quality (measured dichotomously) and socioeconomic status (a combined measure of income, occupation, education, and family structure) both significantly predicted vocabulary comprehension. 2. Day care quality may be particularly important for single-parent, female-headed households.
Smith & Hubbard (1988)	60 children, as well as their parents and teachers in New Zealand	Daily parent records Interviews of parents and staff	1. When staff talked more with parents, and the relationship was warm and balanced, children talked

	41 to 60 months old	Rating scales for parents on parent-staff communication Observations of children's behavior Child-parent interactions Child-teacher interactions Child-peer interactions	more with their teachers. 2. Staff ratings of reciprocity and positive relationships with parents were related positively to child adjustment. 3. More talk between teachers and parents was related to fewer negative interactions between children and their peers.
Sonenstein & Wolf (1991)	382 AFDC mothers with children under 6 in Boston, Charlotte, and Denver, in 1983	Staff:child ratios Teacher training in child development Ratings by mothers on caregiver experience, learning opportunities for children, adequacy of supervision, discipline, safety, the ability to meet emotional needs of child, child feelings about caregiver, child's happiness, convenience, dependability, and cost	1. Mother's ratings resulted in no particular arrangement looking superior. 2. Convenient hours and adequate adult supervision were valued for preschoolers. 3. Low adult:child ratios and convenience were valued for children under 3 years old. 4. Child learning opportunities, happiness, and lower levels of caretaker experience were important for older preschoolers. 5. Type of care used was not directly associated with satisfaction.

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Family Child Care

Reference	Sample Description	Measures	Results
Fischer & Eheart (1991)	177 family day care providers (59 unlicensed) 1 non-English speaking	Telephone interviews Family Day Care Rating Scale	1. Training, affiliation with support networks, and years of schooling explain 69.82% of variations in caregiving practices. 2. Overall quality of care in family day care was low.
Goelman & Pence (1987)	105 children in 53 centers and 52 family day care providers Predominantly White (Canadian) SES varied 50% two-parent families Approximate ages 3 to 4 years (ages not provided)	Observational assessment and parent ratings of classroom quality Direct assessment of child outcomes (language, peer interactions)	1. Among children attending center-based care, quality of care did not predict language development scores. 2. Children in center-based care engaged in more high-quality "information activities" than did children in family day care. 3. However, for children in family day care, the amount of "information activities" was not related to quality. 4. Children attending high-quality family day care homes had higher average scores for language development than did children attending lower-quality family day care homes.
Howes & Stewart (1987)	55 children in 55 family day care homes	Observational assessment of family day care quality	1. More changes of family day care provider were

	Heterogeneous social classes and parent educational levels (including 18% low SES) 82% two-parent families Ages 11 to 30 months	Direct assessment and observer ratings of child outcomes	associated with lower-level play with objects and peers. 2. For boys, earlier child care entry and fewer changes in provider were also associated with higher-level play with objects. 3. Higher overall quality of care was related to higher levels of competent play with adults and with objects. For girls, the relationship was also significant for higher-level play with peers.
Kontos (1994)	57 children and 30 family day care providers Middle SES 82% two-parent families Ages 2½ to 4 years	Childrearing Practices Report Questionnaire on Social Support Cognitive Play Scale Peabody Picture Vocabulary Test-Revised Howes Peer Play Scale Classroom Behavior Inventory Family Day Care Rating Scale	1. Children in family day care homes that were rated at a higher level of overall quality were significantly less likely to engage in simple cognitive and social play, were rated as significantly more sociable, and scored higher in receptive vocabulary, controlling for maternal education, caregiver experience, and conditions of caregiving. 2. Children in higher-quality family day care homes who had mothers with more education and caregivers with less experience were rated as significantly more sociable. 3. Children in higher-quality family day care homes who had mothers with a higher level of education scored higher in receptive vocabulary.
Kontos, Howes, Shinn, & Galinsky (1995)	820 mothers, 225 children, and 226 providers in CA, TX, and NC	Arnett Scale of Caregiver Sensitivity Howes Involvement Scale	1. Parents and providers agreed on most important elements: child safety, parent-provider

	42% White, 23% African American, 31% Hispanic Heterogeneous social classes and maternal educational levels 81% 2-parent families Ages 10 months to 5 years	Family Day Care Rating Scale Waters & Deane Attachment Q-set Smilansky's Cognitive Play Scale Limit Setting Measure Block & Block Child Rearing Attitudes Scale Adult Work Environment Providers' perceptions of quality	communication about child, warm relationship between provider and child. 2. Provider sensitivity and responsiveness correlated with children being more attached to the caregiver. 3. Higher-quality providers committed to work seek learning opportunities, plan, seek out other providers, are regulated, have more children, charge more, and use standard business practices. 4. Children who spent more time with their caregiver, were cared for in homes with more children per adult, and had caregivers who used more responsive interactions engaged in greater amount of play with objects; children with more educated mothers and more responsive caregivers engaged in more high-level object play. 5. Larger group size and child:staff ratios were related to more peer play. 6. Higher global quality was related to more object play, more high-level object play, and better child attachment security. However, higher global quality was related to less high-level peer play. 7. Neither family background characteristics nor child care characteristics predicted children's language development or social adjustment.
Kontos, Howes, Shinn, & Galinsky (1997)	186 child care providers to African American, European American, and	Provider demographics Arnett Scale of Provider	1. Providers for moderate-income children were rated as more

	Latino children More than half of children were from very-low-income or low-income families	Sensitivity Adult Involvement Scale Family Day Care Rating Scale Howes Peer Play Scale (revised) Object Play Scale	sensitive than providers for very-low-income children. 2. Latino children were more uninvolved with objects and watched more television than did European American children. 3. The majority of children were cared for by a provider in the same ethnic group.
Kontos, Hsu, & Dunn (1994)	60 caregivers in 30 classrooms and 24 child care centers 117 children (55 boys, 60 in centers) Ages 30 to 60 months	Group size and adult:child ratio Childrearing Practices Report Adult-child interactions Early Childhood Environmental Rating Scale Family Day Care Rating Scale 2 cognitive play scales Slosson Intelligence Test Peer Play Scale Classroom Behavior Inventory-Preschool	1. There were significant differences in structure, process, and global quality characteristics between family day care homes and child care centers. 2. There were no differences in children's level of sociability between center care and home care. 3. Variations in caregiver training and how they interact with children make a difference to children's cognitive and social competence.

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Child Care in Inclusive Settings

Reference	Sample Description	Measures	Results
Buysse, Wesley, Bryant, & Gardner (1999)	180 child care centers in 12 regions of NC	Early Childhood Environmental Rating Scale	1. 34% of the early childhood programs reported enrolling at least one child with disabilities. 2. Inclusive programs scored significantly higher on the Early Childhood Environmental Rating Scale than did noninclusive programs 3. Teacher education, professional experience, and teacher self-ratings of knowledge and skill were predictors of global program quality.
File & Kontos (1993)	28 children in 6-12 center classrooms 50% had mild or moderate cognitive and/or speech and language delays Ages 2½ to 6 years	Observational Assessment of Quality Direct assessment of child outcomes	1. Positive teacher interactions with children were related to a higher level of children's social play. 2. Less teacher involvement in routine activities, less watching, less support of cognitive play, and more overall teacher uninvolvement were also related to higher levels of social play. 3. Children's experiences with their teachers were not related to their level of cognitive play

			of cognitive play).
La Paro, Sexton, & Snyder (1998)	58 community-based early childhood settings with at least one child with disabilities 29 segregated/29 inclusive Ages 3 to 5 years	Early Childhood Environmental Rating Scale Classroom Practices Inventory (CPI) Teacher Beliefs Scale (TBS) Instructional Activities Scale	1. Segregated and inclusive settings highly similar on global DAP ratings. 2. Levels of quality moderately good in both types of settings.

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Faces to the Window: "The Construction Project"

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St. Patrick's Episcopal Day School
Washington, DC

Abstract

A view of construction from the window of a first-grade classroom was the catalyst for a multigrade, multidisciplinary curriculum project at St. Patrick's Episcopal Day School in Washington, DC. The article has two sections. In the first section, one of the school's science teachers provides background information. In the second part, a first-grade teacher reflects on her classroom's project that gradually came to encompass teachers and children throughout the school. The teacher's colleagues in technology, science, art, religion, and music, as well as children in the nursery school, kindergarten, and grades 5 and 6, worked with her first-grade students on different portions of the project. The children and their work are documented in captioned pictures.

Background on "The Construction Project": Julia H. Berry

In a preschool or child development center, a project investigation can involve all of the children and the entire day as interest and involvement engage the class. Pursuing a project in an elementary classroom is a little different. A teacher of school-age children has a formal curriculum to implement that includes skills and knowledge that her children must master. For many elementary teachers, taking on a project can feel like an extraordinary burden added onto what is usually an overfilled daily schedule.

St. Patrick's Episcopal Day School is a nursery through grade 8 independent school in northwest Washington, DC, with an enrollment of about 460 students. In her reflections presented below, Elizabeth Allen, a first-grade teacher at St. Patrick's, describes how "The Construction Project" gradually became insinuated into her teaching despite her reluctance to add "one more thing" to her already busy lesson plans. How did this happen? Mrs. Allen knew from the children's persistent questions and lingering looks out the window that their interests and attention lay outside her classroom. The very best teachers are those who learn from years of teaching experience how to plant the seeds of their students' passions and nurture them into bloom between the cracks of the daily routine. Elizabeth Allen is

one of those teachers.

The Construction Project, which grew out of a simple and unplanned activity, became a highly successful months-long learning experience not only because it came from the interests of the students but also because it fit in with their everyday learning. As you read about the evolution of the Construction Project in Mrs. Allen's classroom, you will see the project phases described in Helm and Katz's book *Young Investigators: The Project Approach in the Early Childhood Classroom* develop as the children and teachers conduct their investigations just as clearly as if Mrs. Allen had planned the project from beginning to end.

St. Patrick's Episcopal Day School, Washington, DC.

In employing the Project Approach, as in all good teaching, one should never underestimate the power of discussion and reflection. Talking about our work in the classroom, both successes and failures, provides opportunities for collaboration across classrooms, grades, and disciplines. Whether you are a student or a teacher, discussing, analyzing, and reflecting with others can bring new ideas, new talents, and new excitement to a project. Talking about her students' enthusiasm for their work and asking others with expertise and time to help brought both technical knowledge and new social opportunities to Mrs. Allen's first-graders. The project became broader, deeper, and richer.

Our message to teachers just beginning project learning is: Don't be daunted by the size of a project. Start small. Let it build on itself. Your students' enthusiasm will help carry you along. Talk to others and invite them to help. Project work is richly rewarding.

A Teacher's Reflections: Elizabeth H. Allen

The building site was right outside one of the windows of our classroom. The window didn't give a full view of all the action—we had to go outside for that—but a real estate agent advertising the view would confidently describe it as "a picturesque view of the building site" instead of the more accurate "building site squint." The view was significant because it was just small enough that the class could have ignored the construction and

simply waited to be irritated by the loud noise when the drilling into the outside walls of our classroom began.

Mrs. Allen and her class watch the construction from the playground deck adjacent to their classroom.

I felt deep in my conscience that I ought to use the construction as an opportunity to realize all those Piagetian ideals of taking young children beyond their present world by moving from the tangible and visible concrete world to explore the hitherto unknown. But, as I was wrestling with my conscience, several enormous pieces of excavation machinery arrived outside the windows. These first big earthmovers lumbered about, while beneath their wheels little fussy worker-bee equipment rushed around behind the scoopers and diggers, patting the ground flat and making it tidy. They seemed like a Mom putting the bedrooms straight in the morning to give the house that tidied-up feeling, so the real work of the day could begin.

Excavation equipment working on the construction site.

Suddenly the enormous machines' work was almost finished. It was then that I realized they would soon be gone forever—and a fantastic teaching opportunity would be lost. Promising myself every possible escape route, "We'll just ask the computer teacher to take pictures of the equipment, and the children can *write* about it!!" Ms. Martin, the computer teacher, rushed down to the playground and took pictures with the school's digital camera. A sense of relief poured over me as I realized we had just, and only just, caught the boat.

Each day, the children asked me question after question about what they could see happening outside the window. I told them what I knew—that a new school building was going to be built on the old play park and that, yes, they would still be at school when it was finished, and, no, I wasn't sure what it would look like, but Mark Vershbow, the business manager, did know, and, yes, we could invite him to the classroom to show us the plans and answer our questions.

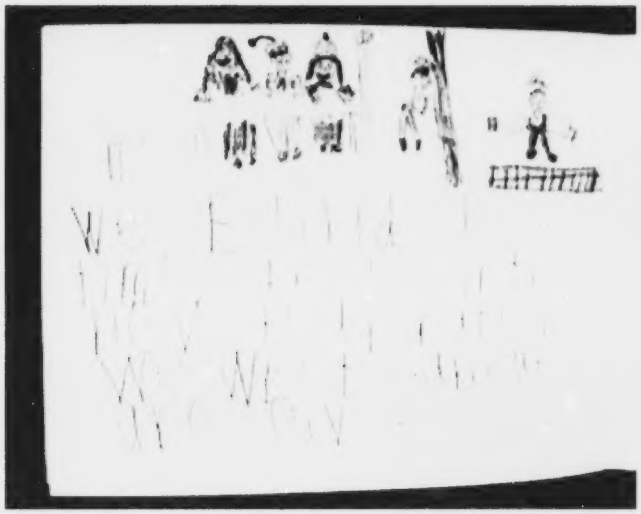
He came. He brought the blueprints and Marney Bands, the construction company's project manager ("A woman in charge of all those men?... Hmm, interesting," the children thought). Mark and Marney explained what the plans represented, and how the architect (a new occupation to some students) represented windows and doors on the plans. My idea to have the children draw a "blueprint plan" of their desk top was swept away by other events, but ideas for teacher lesson plans were sneaking up on me.

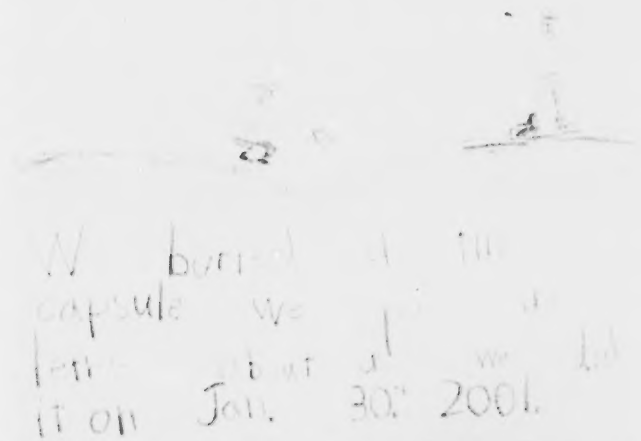
Mark Vershbow, St. Patrick's business manager, and Marney Bands, the construction company job manager, visit Mrs. Allen's class to show the architect's blueprints and answer questions.

It was at this point that I began to pick my way gingerly towards the beginning of a Construction Project, but not alone. Ms. Berry, the science teacher, was also taking digital pictures of the construction site. One day, she came in to tell me that the concrete trucks had arrived and were about to pour concrete into trenches already laid with rebar (metal rods that support and strengthen foundations). We dashed outside to watch the pour, and as we watched, I realized once again that this was a now-or-never moment. We should make a time capsule! In high excitement, we rushed back to the classroom where I found a Cadbury's Flake can bought on my last trip home to England. Quickly, the children wrote facts about themselves and their future goals and dreams, while Ms. Berry sought out the foreman to see if we could bury our can in the foundation. On her return, the excitement in the room reached an almost fever pitch. We learned that he would help us bury our can, but that it was to be TOP SECRET because we were not really allowed to do it. Ms. Berry recorded the event on camera. Back in the classroom, I looked for the empty blank books that I had bought the year before, simply because I liked their empty white pages, but with no specific idea as to what I would use them for. Miracle of miracles, I found them and there were enough. In the books' fresh pages, the children wrote their first*Construction Project Journal* entries.

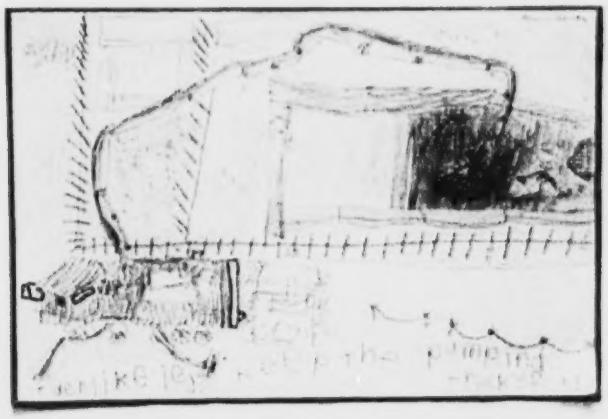
The concrete trucks arrived and began to pour.

The concrete foreman holds the time capsule for the children to see before he pushes it down into the freshly poured concrete, first with his hand and then with a long rebar pole. Going, going, gone!

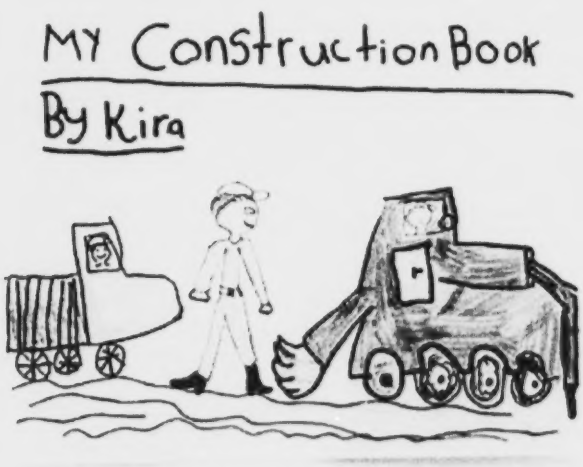




Children write about the time capsule in their construction journals.



Two girls collaborated on this very accurate rendering of the concrete pumper. Note their written observation that "The spider-like legs keep the pumping truck steady."



The cover of a student's construction journal.

It wasn't until I got home that night that I remembered a photograph of a little girl and woman and Chinese construction worker. I went to the basement and found the inch-and-a-half-long photo. On the back was written "E(lizabeth) burying a silver dollar in the foundations." This was a photograph of me and my mother in Malaysia when a new bungalow was being built for our family on the rubber estate where my father worked as manager. It still pleases me that the favorite candy of my favorite aunt (a wonderful teacher who died 1988) was Cadbury's Chocolate Flake. As a "teachable moment," that day was as about as good as I ever expect to meet in my career. The class and their teacher were well and truly into this project.

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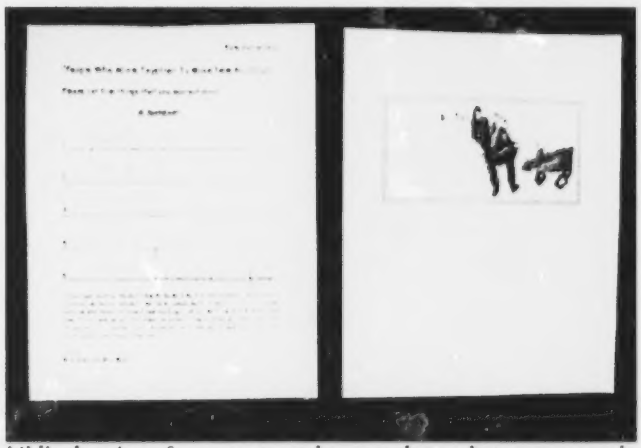
Elizabeth Allen (age 3), her mother, and a construction worker burying a silver half-dollar in the foundation of their home in Malaysia .

Ms. Berry was the school's faculty representative on the building project and kindly liaised between the work crews and the classroom. She also made arrangements for the children to go out in small groups to interview the men when the snack truck came. I drew up an interview questionnaire, so the children would have specific questions to ask, for example, "What is your job?" "How long have you done this work?" "What do you like about it?" "What do you dislike about it?" Most of the men said they disliked working in bad weather. Nearly all said they had learned their trade on the job. Ms. Berry came back with one group who had discovered that one man's grandfather had come from Lithuania—providing an opportunity to look Lithuania up on the map—and had worked on the wood-carvings in the U.S. Capitol building. After their interviewing experience, the children could no longer see construction workers as just construction workers. They knew the workers' names and were deeply respectful of their skills and work. I wonder if they will always pass a messy, noisy building site with respect and knowledge, and see the people who labor there as individuals. It would be nice to think so.

Children in their hard hats, clipboards ready, interview workers on the construction site. Sometimes spelling was hard!



A child's drawing of a surveyor and report about what a surveyor does.

As part of our regular first-grade curriculum, the children study author Gail Gibbons and write a nonfiction book about a topic that they are, or would like to become, an expert in. It was in connection with the author study that the children read the book *How to Build a House* by Gail Gibbons. Ms. Berry used the book to introduce the vocabulary of a construction project—foundation, excavation, footings, surveyor, framing, mason, among others.

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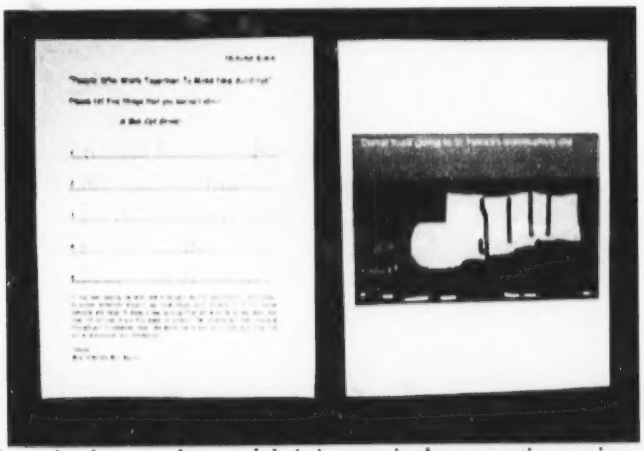
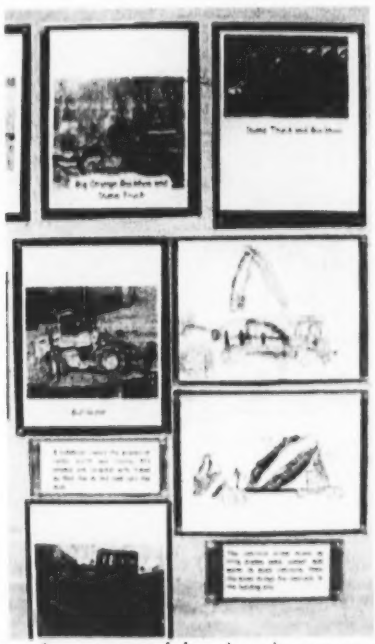


The technology teacher used their interest in the excavation equipment as a focus for teaching the children how to use Kidpix ® drawing software.



Children's research reports and drawings in crayon, colored pencil, and ink of construction equipment. The children observed the equipment as it worked and studied digital photographs and resource books before attempting their drawings.

Afterward, the children were given the nursery rhyme "This Is the House That Jack Built." The children then read and illustrated the text, making sure they had a drawing for each key noun mentioned. The subsequent drawings were delightful—cows with crumpled horns and maidens all forlorn. This activity also added a number of adjectives to the students' working vocabulary.

In science class, Ms. Berry proposed that the children build a model of the new school building. The science lab became a woodworking center as the children began to accurately measure, saw, and drill wood pieces and then glue them into cubes, so they

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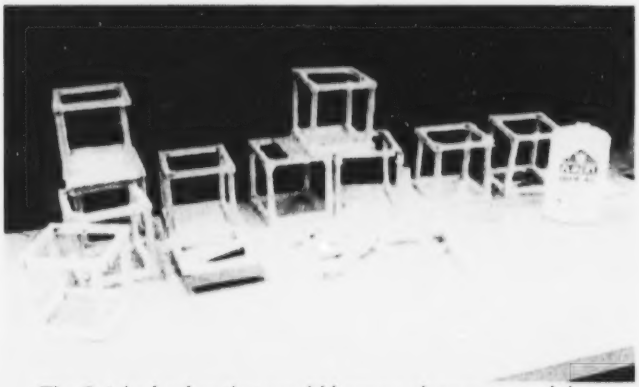
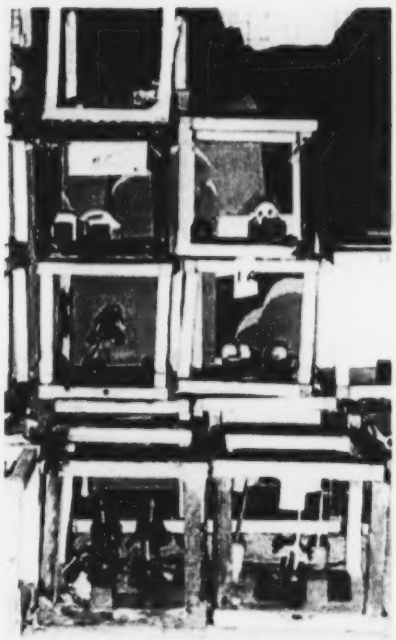
could each make their own new classroom. Over several weeks, the classroom cubes were painted, interiors decorated, and miniature furniture made. The completed cubes were assembled into a building on top of a foundation the children poured from concrete brought in to the lab by the brick masons.

In preparation for building a model of the new building in science class, the children were given toothpicks and marshmallows to experiment with different shapes for building. One student (a future architect, perhaps) drew a plan before she tried building her marshmallow structure.

The girls discovered early in the process that collaboration in measuring helped with accuracy.

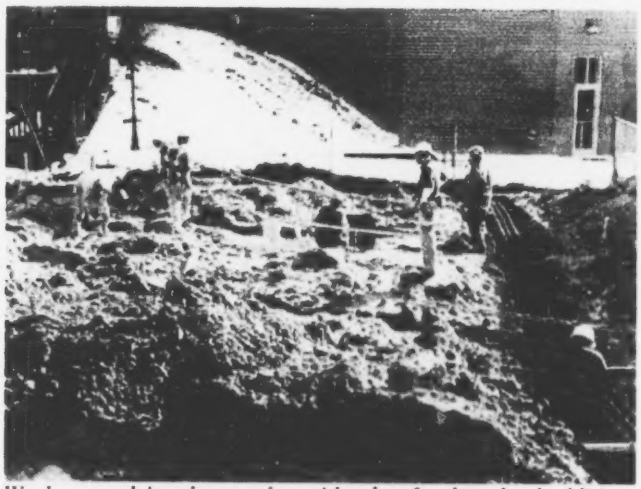


The finished cubes that would become classroom modules.



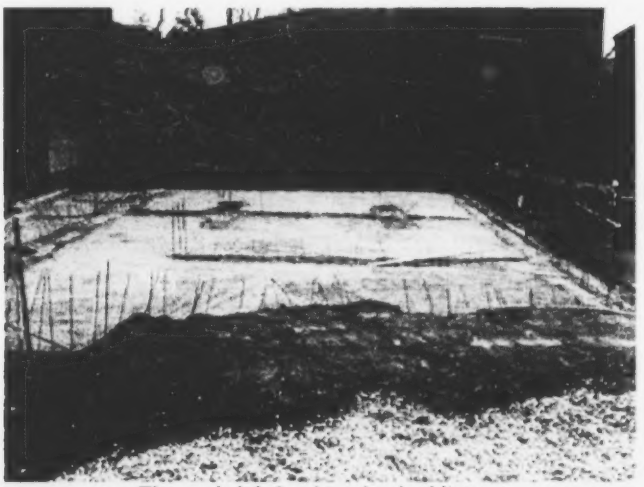
The children furnished each classroom cube.

The children dug trenches in a tub of sand to make grade beams for their foundation. They placed paper-clip rebar in the trenches to strengthen the beams before adding concrete.

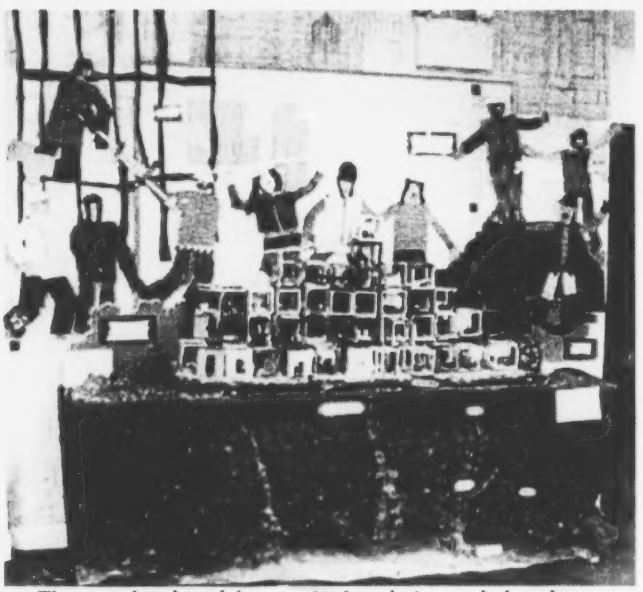


Workers readying the trenches with rebar for the school addition.

Ms. Berry used concrete brought in by the brick masons to smooth a mud slab on top of the grade beams the students had poured the previous week.

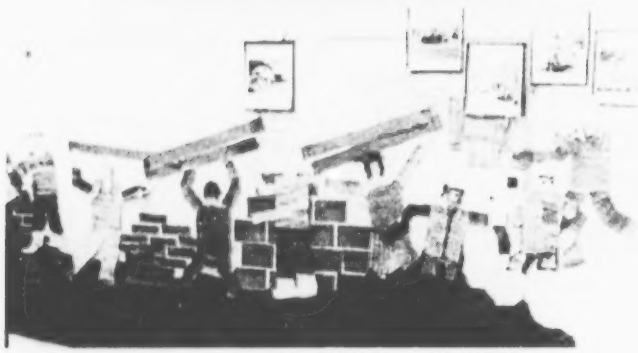


The mud slab for the school addition.



The completed model sat on its foundation and also above a cut-away view of the Earth showing the core, mantle, and tectonic plates that make up the Earth's crust. The children painted the underground mural as part of their Earth Science unit.

Excitement about our construction project began to spread throughout the school. In the art department, Mrs. Jones, the art teacher, began a study of figures in motion using photos of the workers doing different jobs. These figures became a background mural for the science class's school model.

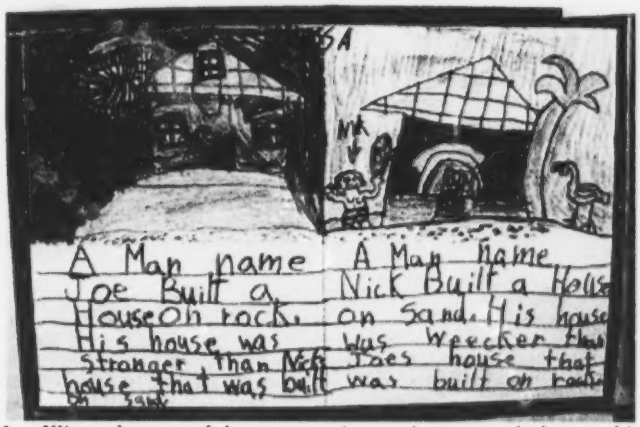


In the art studio, children studied the human form in action using digital photos of construction workers. Mrs. Jones made realistic paper fabric by photocopying plaid and denim cloth on our color copier. The finished figures were displayed in action behind the building model they built in science class.

After exposure in art and science to hands-on building, the children were invited to make their own machine out of "junk" such as toilet rolls and boxes. This activity was a choice, not a requirement, and it was exciting to see about 10 children take the opportunity to make machines and bring them in.

About 10 children built models of excavation equipment at home using recycled materials such as cereal boxes, paper tubes, and deli boxes.

In religion class with Mrs. Klingenburg, the children were read the story *A Tale of Two Houses* by Melody Carlson, after the parable in St. Luke's gospel (Chapter 6, verses 47-49), about the wise man who built his house upon rock and the foolish man who built his house upon sand. The children drew a house built on rock and a house built on sand and retold the story in their own words.


A Man name Joe Built a House on rock. His house was stronger than Nicks house that was built on sand.
A Man name Nick Built a House on sand. His house was weecker than Joes house that was built on rock

Mrs. Klingenburg used the construction project to teach the parable of the wise man and the foolish man. The children were read a book based on the parable and were asked to rewrite it in their own words. They illustrated their retellings with colored pencil drawings.

In my class, the children continued to add entries to their construction journals. They also wrote poetry after collecting "sound words" with buddies from Miss Smith's sixth-grade language arts class. They read and rewrote a story from The Oxford Reading Tree series *The New Classroom.* The story is about a new prefabricated classroom being lowered into place at school. The children in the story discover that the classroom module has been placed upside down. Once it had been turned the right way up, the children in the story go inside to inspect their new classroom. They find that the toilets in the bathrooms are now upside down! To change the format a little, I made color photocopies of the book's pictures and left the space underneath for the children to write their own words. I gave the same story pages to Mr. Locke's fifth-grade class who were unfamiliar with our readers, and they wrote their own versions of the story. The first-graders and fifth-graders were then paired up to read each other's stories. My first-grade class had now worked with both sixth- and fifth-grade students. Now when they met in the corridors, the children knew each other and greeted one another as friends. This community building was an unexpected benefit of our project work.

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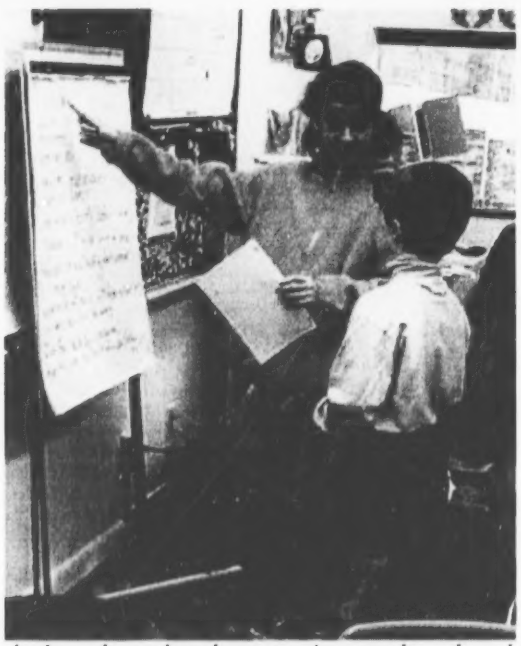
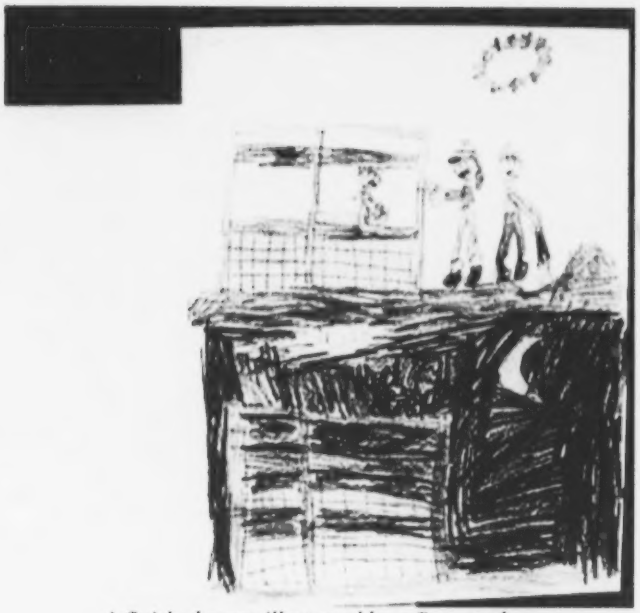
Grade-6 teacher Ms. Smith collaborated with Mrs. Allen in a poetry writing experience for their two classes.

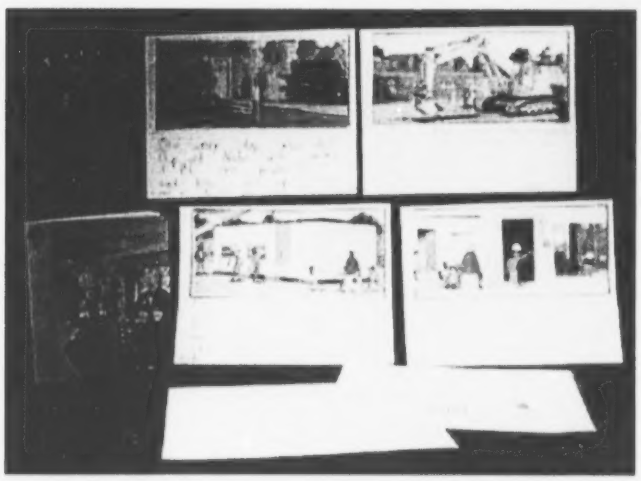


Children in both grades gathered construction sound words and made lists.

The children worked together in small groups to write construction poems.



A finished poem illustrated by a first-grader.



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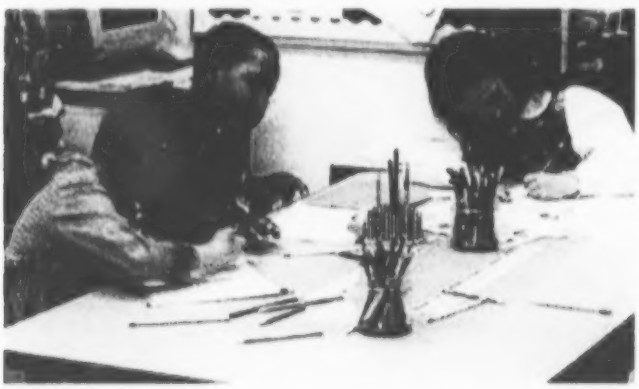
The Grade 1 Oxford Reader series had a story about school construction, Our New Class. *Mrs. Allen put copies of the illustrations into blank books for the children to write their own story.*

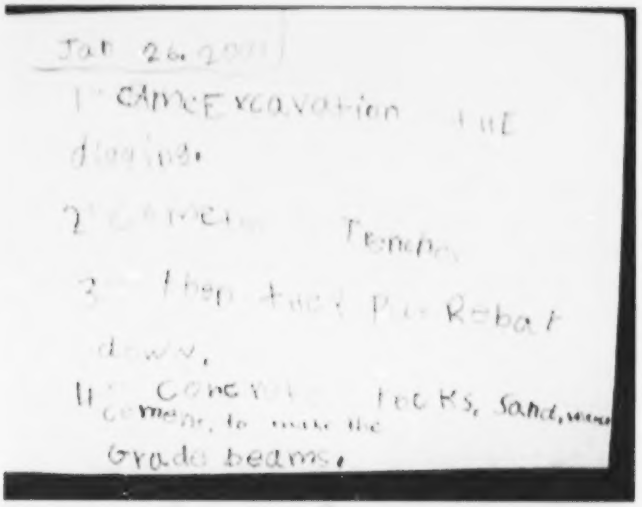
Mr. Locke's fifth-grade class used the same blank books to write their own version. The first- and fifth-graders read their stories together in a hallway.

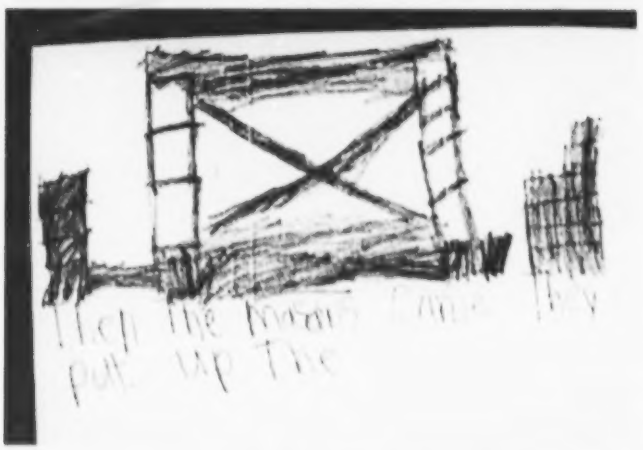
In the classroom, we became the proud owners of a set of construction Lego®. I had planned a 45-minute building session around these blocks, but it actually took about 12! There were some real leaders in the class when it came to following Lego® construction plans. Those children had the plans on the floor and within a few minutes had made the model, complete with hard-hatted workers, pulleys, trucks, roads, and shovels. The Lego® site became a constant source of discussion over the next month and was always being rearranged to reflect the changes outside the window.

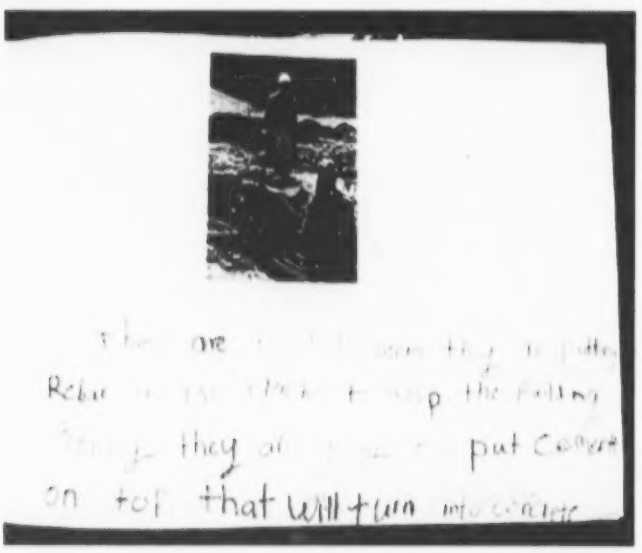
The classroom construction Lego ® materials.

Throughout the year whenever our walls vibrated with noise, we flew to the window to see what was going on. We needed no apology for the disruption, because we were excited by it and it fitted into our work. Although the description of this project makes it appear to be the focus of much of the class's activity, in reality it wove in and out of the regular curriculum and fit in comfortably with the everyday business of reading, writing, and math. The Construction Project was not an overwhelming undertaking because so many participants in the community buoyed it up. The class was richer for being exposed to the world outside our window.









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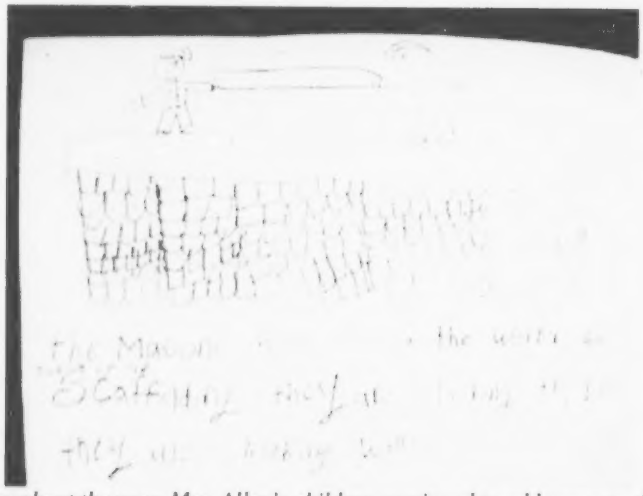

Throughout the year, Mrs. Allen's children continued to add pages to their construction journals. Some of the pages were illustrated by the children; on other pages, the children used miniature prints of Ms. Berry's digital photos as illustrations.

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The enthusiasm Mrs. Allen's class felt about the school's construction project and their growing expertise about the process was an inspiration to everyone. Here kindergarten and nursery school classrooms join in the fun and create machines and structures. Everyone is part of the crew!

Conclusion

Late in the spring, Mrs. Tyler, the first-grade music teacher, generously offered to write a musical play to bring our project to a performance climax. But with the time remaining in the semester, we could not do much more than brainstorm. However, over the summer, Mrs. Tyler took the story of *The Clever Carpenter* by R.W. Alley and skillfully adapted the story into 19 roles and began writing music and songs to go along with the script.

The story is of Samuel Plank, a carpenter, who receives an order to make a chest of drawers for a bedroom and a slide for a school playground. He makes each of the chest's drawers in the shape of the garments to be placed inside, hence a sock drawer is in the shape of a sock, the bow tie drawer looks like a bow tie, etc. Samuel's client is horrified and refuses to pay. Similarly, the school principal dislikes the unconventional slide. The carpenter is out of business until Captain Custard, a sea captain, commissions a house for his retirement. Samuel, watched by all the townsfolk, makes a boat-shaped house that the Captain loves. After being accepted for his unusual and creative ideas, Samuel Plank's fortunes change, and he becomes a much sought-after carpenter.

When a teacher allows herself to embrace project work within the everyday bustle and demands of the classroom, creative ideas have a greater possibility of emerging, blooming, and flourishing. As Samuel states when asked by the Mayor whether he had any ideas for a new town clock, "Of course, ideas are a specialty of mine!" So, when a project opportunity comes your way, promise yourself nothing but move as the circumstances and inspirations hit. The project will energize the children and deepen their classroom life, as well as serving the lofty goal of making them aware of the world around them. And it's fun to do.

The addition was nearly finished at the end of the school year.

Acknowledgments

St. Patrick's is fortunate to have an administrative team that values highly collaborative and integrative teaching as well as a wealth of technical resources to support our work. We would like to express our thanks to Peter Barrett, Head of School, and Gretchen Spencer, our Division Head, for their support and confidence, and to all of our colleagues for their help and enthusiasm.

Author Information

Elizabeth Allen is the head teacher in her Grade 1 classroom, 1C. Julia Berry is a science teacher at St. Patrick's and the assistant head of the nursery school.

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ERIC/EECE News

A New Publication from ERIC/EECE's National Parent Information Network

Violence Prevention Resource Guide for Parents

Parents, teachers, and family support professionals often look for resources that provide an easy-to-read balanced view of the complex issues surrounding violence among children and youth. To fill that need, ERIC/EECE's National Parent Information Network produced the *Violence Prevention Resource Guide for Parents*. The Guide is designed to provide easy access to information about the three main stages in childhood: the early years (birth to 5), the middle years (6 to 12), and the teen years (13 to 18). Within each section are discussions of the issues related to violence in children and practical suggestions parents can use to prevent violence at each stage. Along with a developmental overview, the topics addressed include:

- The Early Years—brain development and infant attachment, impulse control, prosocial skills, violence on television and in other media, toys that promote violent behavior, early child care experiences, and managing family conflict.
- The Middle Years—peer relationships, popular entertainment media, appropriate after-school care and monitoring, encouraging school success, conflict management skills, and meaningful connections within the community.
- The Teen Years—community involvement, substance abuse, access to guns and other weapons, peer influence, dating relationships, and successful transitions to young adulthood.

Also included in the Guide are Parent Summary Sheets—one-page handouts on each topic. The 23 Parent Summary Sheets can be easily photocopied to share with busy parents and professionals.

The Guide also provides a link to related readings on the NPIN Web site (http://npin.org/ivpaguide/appendix/index.html). Portable Document Format (PDF) versions of these readings are available for easy duplication to share with parents and others. The readings can support informal discussions or parenting classes, or can be used

in school "take-home" packets. The online appendix will be regularly updated on the Web site as new resources become available.

The complete Guide, including the reproducible Parent Summary Sheets, is available for $15.00 [plus $2.50 (U.S.) or $5.00 (foreign) shipping and handling]. Checks should be made out to the University of Illinois. For more information or to order the *Violence Prevention Resource Guide for Parents*, contact ERIC/EECE.

Satellite Town Meetings

Since September, 2001, the U.S. Department of Education has sponsored monthly Satellite Town Meetings on various topics in education. The National Parent Information Network (NPIN) has participated in this effort by preparing a resource page related to each of these town meetings. These resources pages are uploaded each month to the NPIN Web site. The following resources are available:

- Talking about Terrorism, Tragedy, and Resilience: Resources for Parents, Teachers, and Family Support Professionals
  http://npin.org/library/2001/n00578/n00578.html
  September 2001
  Satellite Town Meeting: Families Involved in Learning: The Key to Student Success
  (Note that this NPIN resource was slightly off topic. The intention was to provide parents and teachers with information on helping children deal with terrorism, given the terrorist attack in New York that had occurred the previous week.)

- Character Education: The Role of Parents, Teachers, and the Community
  http://npin.org/library/2001/n00584/n00584.html
  October 2001
  Satellite Town Meeting: Character Education: Teaching Respect, Responsibility, and Citizenship

- What Does "No Child Left Behind" Mean for Parents?
  http://npin.org/library/2001/n00594/n00594.html
  November 2001
  Satellite Town Meeting: "No Child Left Behind": What It Means for Parents

- What Does "Testing for Results" Mean for Parents?
  http://npin.org/library/2002/n00620/n00620.html
  January 2002
  Satellite Town Meeting: Testing for Results: Using Assessment to Measure Effectiveness and Drive Instruction

- Charters, Magnets, and Choice: Expanding Options for America's Parents
  http://npin.org/library/2002/n00638/n00638.html
  February 2002
  Satellite Town Meeting: Charters, Magnets, and Choice: Expanding Options for America's Parents

- What Does "Teacher Quality: Ensuring Excellence in Every Classroom" Mean for

Parents?
http://npin.org/library/2002/n00654/n00654.html
March 2002
Satellite Town Meeting: Teacher Quality: Ensuring Excellence in Every Classroom

- Improving America's High Schools: Preparing America's Future
  http://npin.org/library/2002/n00700/n00700.html
  April 2002
  Satellite Town Meeting: Improving America's High Schools: Preparing America's Future

Each month on the NPIN home page, you can find a link to the resource that has been prepared for that month's Satellite Town Meeting. Visit the NPIN home page at: http://npin.org.

For information on the satellite broadcasts themselves, you can visit this page maintained for the U.S. Department of Education:
http://www.connectlive.com/events/edtownmeetings/.

This page provides a list of all the town meetings, with links to information about each specific meeting. This information includes a description of the content of the meeting plus instructions for participating in the meeting. Links are also provided to video archives of the Satellite Town Meetings. These archives are available in RealMedia format. The RealPlayer is required to views these files. Links are provided for downloading this free player.

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